This magazine is published to promote sound thought upon and concerning industrial medicine and traumatic surgery. To that end it will contain articles, news items, reports, digests, and other presentations, together with editors' comments. The editorial policy is to encourage frank discussion. On this basis contributions are invited.

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Trauma and Cutaneous Cancer

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FOR many years, physicians have searched in vain for a clue to the cause of cancer. Many theories involving heredity, race, sex, genetics and the like have been evolved only to be subsequently discarded. However, in certain varieties of malignant growths, the bulk of clinical evidence points towards a definite relationship with prolonged, repeated irritation. A few of the most frequently encountered clinical types would include cancer of the lip in pipe-smokers and cancer of the uterine cervix in multiparous women. In fact, there are few types of cancer which do not show a relationship to some form of pre-existing trauma. Of course, in cutaneous malignancies, most patients can always recall some injury, imaginary or otherwise, to the affected site.

Whether malignancy can occur following a single injury to a part is a debatable subject but a very important one legally. This question can only be solved by time and study from an experimental viewpoint. If, by this theory, cancer followed a single traumatic incident, a modification in current conceptions would be necessary inasmuch as there are practically no proved cases in medical literature. The difficulty is the impossibility of ruling out a previously present cancerous growth. Still another problem would include the consideration of the so-called blastoma constitution. This involves a study of genetics and heredity in all cancerous patients with a view towards transmission of carcinomatous tendencies. It is claimed that extrinsic factors, notably trauma, will never produce a malignant growth if the individual is not predisposed towards the development of cancerous tissue. In this respect, a study by Champlin[1] of a pair of identical twins is very interesting. One of the brothers was hit in the right testicle with a board and, in a short time, he developed a sarcoma of that organ which led to his death at the age of 26. The other twin died five years later from sarcoma of the corresponding testicle. The probability is that the deceased brother would have lived five years longer if there had not been a superimposed traumatic factor.

Incidence

IN general, there has been no increase in cancer attributable to industry as a whole. However, there has been a marked increase in tumor formation in certain definite occupational groups. The industries most frequently involved include those utilizing tar, petroleum, radium and derivatives. Specialized occupations such as locomotive firing, mule-spinning and chimney-sweeping also show a high incidence of cancer. In 1910, Neve[2] reported that in 1189 cases of epithelioma in the Kashmir Hospital, 848 were of the thighs and abdomen and resulted from burns and trauma directly attributable to the kangri, a portable fire-box used by the natives to warm their bodies. From 1920 to 1939, Bridge[3] reported the occurrence of 1151 cases of carcinomatous ulceration with 296 fatalities in the tar and oil industries in England. Of 25,000 adult males engaged in mule-spinning, about 2.5% develop cancer of the scrotum, according to Southam.[4] In this group, the average age was 53 years and the average duration of employment was 40 years. Leitch[5] published a series of cases of cancer in chimney sweeps. His figures showed an incidence of 4.6 fatal cases yearly, or approximately 0.1%. In the pitch industry, Ullman[6] reported 10 cases of cancer of the scrotum in 25,000 workers. In this country, Schamberg[7] reported four cases of cancer in tar workers. The men affected drew paper saturated with coal tar through rollers, with a resultant thorough smearing of their arms with coal tar. Hargenson[8] reviewed 455 cases of occu-

pational cancer seen at Memorial Hospital in New York. In his series, 221 cases followed exposure to sunlight, as in farmers and sailors. Oil workers were the next largest group, accounting for 160 cases. Workers in tar and pitch, coal and radioactive substances were third with approximately 20 cases each.

Experimental Cancer

IN this century of rapid strides in medical research, an epochal step was the experimental production of a cancerous growth. Today there are numerous methods of producing a malignant growth practically all of which involved the factor of constant traumatic stimulation. The first successful attempts in the production of experimental cancer of the skin were performed by two Japanese observers, Yamagiwa and Ichikawa[9] in 1915. Their experiments consisted of the application of tar on a rabbit's ear every few days for one year. Yamagiwa had thought of tar because of the high incidence of skin cancer in tar workers. Their experiments have been confirmed by Tsutsui[10] and numerous recent observers. The method was based on this hypothesis: "The repetition or continuation of chronic irritation may cause a precancerous alteration in epitheliums previously normal. If the irritant continues its action, carcinoma may be the outcome, even though no specific agent has been interpolated." The daily application of tar to white mice produced malignant change after 140 days according to Roussy.[11] Since these studies, numerous other irritants such as the roentgen-rays have been used with successful results. In the smaller animals, approximately one-fifth of the normal life span of the animal has to be affected by exposure to the carcinogen if malignancy is desired. In humans almost the same time relationship has been noted. About 10 to 20 years usually elapse before the development of malignancy. Cramer[12] performed a very interesting series of experiments. He applied tar to a small area of skin for several months, with the development of a verrucous growth. When the tar was applied to a large area of skin, one or several growths appeared. Some were benign and remained so. In others, one tumor was malignant and the rest benign. It was very rare for two malignant tumors to develop simultaneously. If the malignant tumor was removed, several developments were possible: Either one of the remaining tumors became malignant or new benign growths developed, one of which might become malignant. Removal of one of these might even lead to the development of a third cancer. When the base of a benign growth on a tarred area was cauterized, it immediately became malignant in a majority of the cases. From these observations Cramer concluded that "the process of carcinogenesis is probably not a continuous one, but composed of two phases: (1) a process of long duration which induces in the epithelial cells a condition of potential malignancy; (2)a local breaking down of resistance, which allows of an immediate malignant development of the potentially malignant cells." Several observations in humans support some of these experimental studies. In numerous occupational conditions, several benign growths may be present, but only one becomes malignant. This is particularly true of roentgen-ray cancer. The removal of this growth may lead to malignant transformation of one of the remaining benign neoplasms. It would appear as though the cancerous development had led to immunity of the other growths present and that removal of the cancer had incidently removed inhibitory factors affecting the benign growths. Experimentally, the new growth might not appear for at least a year in the mouse, approximately one-fifth of its life span. In humans, a comparable period of time would be at least 10 years, perhaps 20. This should cast some doubt on the validity of the arbitrary five-year cure as a high standard of cancer therapy in man. Evidently the duration of the previous irritant is a very important factor and one to be carefully considered in estimating the length of cure.

Causative Agents

THE rapidly expanding scope of modern industry has greatly increased the number of carcinogenic agents. They may be subdivided into physical, chemical, mechanical and biological irritants:

A. PHYSICAL:

1. *Cold.* While severe degrees of freezing are encountered in the liquid carbon dioxide and allied industries, no cases of cancer have been reported.

2. *Heat.* With continuous or intermittent severe exposures to heat, tissues are subjected to constant low-grade inflammation. This may lead to ulceration and necrosis of tissue with the resultant proliferation of scar tissue. Cancers frequently develop in these old scars. Toro and Itoh[13] reported six cases of cancer which occurred in the scars of old burns. These neoplasms appeared about 30 years following the burns—a definite tendency, therefore, to affect old scars rather than those recently formed. However, malignancy may appear rapidly following a burn, as in the case reported by Macleod[14] wherein a cancer appeared within one month after a severe burn. Thick, tight, dense scars are those most likely to undergo cancerous degeneration. Oppenheim[15] studied a group of railway stokers who had an exceptionally high incidence of epithelioma of the legs. He arrived at the conclusion that the lesions were due to the heat of the fireboxes plus the additional factor of continuous trauma.

3. *Actinic.* Light is composed of vibrations of varying wave lengths and being a form of energy, may act as an irritant similar to heat. Peller and Stephenson[15a] reviewed the incidence of cases of skin cancer in the naval service. They state that "the peculiar conditions of life in the open air, exposure to the sun and salt water among sailors in the U. S. Navy, are associated with the frequency of cancer of the lip and skin eight times more than normal, and that the mortality from cancer of the lip and skin among sailors in the U. S. Navy is three times that of the normal population." Farmers also develop keratoses on exposed re-

gions, notably the face and backs of the hands. These keratoses are often precancerous. Prolonged exposure to sunlight leads to dryness and erythema of the skin at first. Subsequently, scaly, verrucous lesions develop and these may go on to carcinomatous transformation. Most frequently, this transformation occurs in light-complexioned people.

4. *Water.* Water alone is not an etiological agent in cutaneous cancer.

5. *Electricity.* Injuries to the skin by means of high voltage electrical currents may produce severe burns. While these burned areas heal with great difficulty, they are not precursors of the malignant state. The effects of lightning are similar to those produced by the electrical current.

6. *Roentgen-rays and Radium.* The strongly destructive effects of roentgen-rays and radium on the human skin have been known for some time to be similar in effect. Accordingly, they are suitably considered under one heading. We are particularly interested in those rays which are absorbed by the skin and not by the deeper tissues. This, of course, evolves itself into a study of the effects of the extremely potent alpha rays as well as the soft beta rays. The resulting tissue necrosis from severe overdosage leads to atrophy, pigmentation and telangiectasis in the affected tissue. The latter change, which is usually due to a thickening of the arterial coat and a narrowing of the vessel lumen, is the reason for the impossibility of proper healing and the subsequent breakdown of the scar tissue. Radiation burns are not so common now as they were in the early days of roentgen therapy. The reason, of course, is the present-day employment of the proper methods of screening. However, radiation cancer does occur, especially in professional and semi-professional groups such as technicians, laboratory assistants, nurses and doctors. Saunders and Montgomery[16] reported 259 cases of roentgen-ray and radium dermatitis, including 27 epitheliomas. In the group, the growths were more often a result of therapy than of occupation. They postulate that the more extensive the injury, the more likely is the development of malignancy. The length of time between exposure to roentgen-rays and the development of cancer varies between three and 25 years.

B. MECHANICAL:

There are three modes of mechanical irritation of tissue and these are friction, pressure and direct injury. The relationship of direct trauma to cancer of the skin has already been discussed. The fundamental problem concerning the origin of cancer is still too vague to permit a definite opinion in any direction. Accessory factors which include the presence of a co-existent infection, the hereditary element, the reaction of the tissue, the extent and depth of the wound and the treatment administered, all confuse the ultimate issue. Nevertheless, numerous cases have been reported which are ascribed to mechanical injury. O'-Donovan[17] reported a case of cancer of the tongue in a boot-maker who had a habit of holding tacks in his mouth and pushing them out with his tongue as needed. White[18] cites the so-called "Buyo cheek" cancer from betel nut chewing in Oriental countries. He also reports the growth of cancer at the root of the horns of Indian cattle employed in drawing carts yoked to these horns. These instances lead us to the belief that mechanical injury may produce malignant growth but that it is usually the fertilizer which prepares the soil for the implantation of the more virulent carcinogenic agents. This particular theory seems even more probable in the discussion of the etiology of mule-skinner's cancer.

C. BIOLOGICAL:

Bacteria and fungi play a very minor role in the causation of industrial cancer except as secondary invasive and thereby irritative agents.

D. CHEMICALS:

The chemical agents responsible for malignant transformation of tissues are legion. They may be primarily classified as alkalies, acids, salts, and plant poisons. Their destructive properties subdivide them into primary and secondary irritants. Primary irritants are those chemicals which produce burns on normal skin. The secondary or specific irritants are those which produce dermatoses in individuals with a hypersensitivity to the chemical in question.

1. *Acids and Alkalies.* Most acids and alkalies exert a caustic effect on the skin. While this may produce destructive changes of varying types, the incidence of cutaneous cancer is slight except for its appearance in later years in severely burned tissue.

2. *Carbon Bisulphide.* Gougert[19] reported a patient in whom an epithelioma of the cheek developed following contact with a single drop of carbon disulphide.

3. *Arsenic.* This keratogenic agent has long been known to give rise to superficial keratoses, a precancerous lesion, as well as callouses and warts. The uses of arsenics in industry are legion and include dyeing, taxidermy, preserving and "sheep-dipping." Its noxious effects are many but its ability to induce neoplastic growth, irrespective of exposure by internal or external route, is universally known. Workers exposed to arsenical fumes may undergo malignant change of the legs and fingers after a period of 10 or 20 years. O'-Donovan reported three cases of epithelioma occurring in workers manufacturing "sheep-dip," an arsenite of soda composed of arsenious acid and sulphide. The occurrence of arsenical cancer is however comparatively uncommon in industry.

4. *Soot.* This product resulting from the distillation of coal has long been incriminated as a carcinogenic agent although the specific fraction responsible is not definitely known. The growths occur most commonly in chimney sweeps, in which occupation the sweep is constantly rubbing soot-soaked clothing against his body. Henry[20] estimates that 10% of the fatal cases of cancer of the scrotum occur in chimney sweeps. The general incidence of cancer in chimney sweeps is approximately eight times that of the general population. The growth usually originates in a papilloma of the scrotum. The "kangri" cancers previously dis-

cussed are related to cancers in chimney sweeps inasmuch as the hot baskets have a layer of soot-like material on their surface. The prevalence of chimney-sweep cancer in England and its rarity elsewhere is explained by the English custom of burning coal in open grates, a method which produces imperfect combustion and greater amounts of soot containing quantities of tar and pitch.

5. *Coal tar.* The most frequent cause of occupational cancer in the United States is coal tar and its by-products. Schwartz and Tulipan[21] state that 54% of all occupational cancer is due to pitch, 35% to tar and 5% to heavy tar oil. Tar and pitch from gas works account for 70% of all cases of tar cancer, whereas the same substances from coke ovens produce only 5% of the cases. Of the many substances present in coal tar the most active carcinogens are most often contained in the distillates which come off at the highest temperatures. Pure anthrasene, phenanthrene, carbayol and acridine do not cause cancer.[22] Woglom[23] states that, on the basis of Kenawagi work, one can probably also exclude creosote oil, coysene, retene, picene, fluorene, naphthalene, acids, bases, paraffins, olifenes and all the light naphthas. The principal carcinogenic distillates contain dibenzanthracene, benzopyrine and pyridine. Oppenheim[24] reported four cases of epithelioma occurring in 24 men who had worked over 10 years in a tar factory.

6. *Petroleum.* Petroleum is another leader in the neoplasm producing group. Shale oil is probably the worst offender, although of 50% of the workers who have skin conditions, only one man yearly per thousand workers exhibits malignant growth. Twart and Twart[25] rate the carcinogenic powers of oils as follow, in order: Shale, Venezuelan, Borneo, Rumanian, Persian, Californian, Mexican, Midcontinental, Texan, Pennsylvanian, and Russian. They believe that the benzenoid hydrocarbons in oils are carcinogenic, and that treatment of these with sulphuric acid or by oxidation and reducing processes, or refining almost totally destroys these carcinogenic properties of the oils. This has been successful experimentally but has not had any commercial application. The pure mineral oils are not growth-stimulating. Supposedly, the more fluorescent the oil the less is its carcinogenicity. Wood[26] claims that pure paraffin is not productive of cancer and that the tumors caused by oil, liquid petroleum and paraffin are not neoplasms but foreign body granulomas. This suggestion is supported by the results obtained from paraffin injections, in the past, for the remedy of cosmetic defects. These injections occasioned granulomatous but not malignant reactions of the tissue.

The frequent occurrence of cancer of the scrotum in mule-spinners is another instance of trauma acting upon a carcinogenic agent present on the skin. The lesions are believed due to friction against the scrotum from the spindle on the mule frames because of the workmen's habit of constantly leaning over the oily fallen shaft. In addition, the workers' overalls are constantly soaked with mineral oil. Of the 25,000 adult males employed in this industry, Southam[27] states that 2.5% show malignant changes of the scrotum. Henry[28] reported 345 deaths from cancer among the mule-spinners and estimated that 0.25% of all spinners in England have scrotal cancer. Although the spinning machines and the type of working process are the same in the United States as in England, mule-spinner's cancer is extremely uncommon in this country, indicating a marked difference in the carcinogenic properties of American oil and Scottish shale oil.

Accessory Etiological Factors

THERE are many substances which are capable of producing cancerous lesions. While these agents produce similar lesions in most cases, the time intervals are different. Thus tar may lead to a carcinoma in 10 years in one case, and in another, in comparable occupational exposure, may require 20 years. It is obvious, therefore, that the irritative agents themselves are not the sole factors. There must be several general etiological causes to be considered.

1. *Age.* It has been stated that cancer is a disease of old age. This is true in industrial cancer where the lesions are more frequently seen in older people. There are several explanations of this observation. In the first place, the irritants must be present over a period of years in order to exert their effects. Secondly, the tissues become more inelastic and are more easily broken down in the older age brackets.

2. *Heredity.* The importance of heredity in cancer has long been stressed ever since Cohnheim's theory of cell rests. While "cell-rests," composed of embryonic cells, form a nucleus for malignant growth in some cases, the majority of industrial cancers arise from mature cellular tissue. Genetics have always been given an important role in cancer development. Maude Slye[28a] showed in a series of breeding experiments that spontaneous cancer is inherited as a recessive Mendelian trait. Numerous instances of an hereditary taint have been described in the literature. The question arises as to how important a part this inherited tendency plays in occupational malignancy. Is an underlying malignant constitutional tendency necessary for the superposition of a traumatic neoplastic lesion? The modern trends suggest an affirmative answer. Not only is there a general susceptibility but also a tissue susceptibility. A single family may all develop cancer of the lip whereas all the members of another genetic strain will engender breast tumors.

3. *Sex.* Sex incidence does not play a strong role in industrial cancer. Of course, in those industries where males are predominantly employed, the incidence of male growths is correspondingly high. Then again, in lesions affecting male organs, notably the scrotum as in mule-spinner's cancer, the incidence again is high. The total number of cases is proportional to the percentage of men or women in that industry.

4. *Immunity.* Several phases of this problem have already been discussed. The hereditary tendency is one. The immunity developed by animals

following the removal of a growth produced by tarring is sufficient to protect them from the development of further neoplastic growths on subsequent exposures. Then again there is the tissue immunity which protects animals with one cancer from undergoing malignant transformation in other benign growths simultaneously present. The role of allergy, especially in reference to the Arthus phenomenon is a moot point. The possibility of sensitizing the entire system with one irritant to be followed by continuous trauma and a penetration of the same irritant into some local region is purely of academic interest.

Histopathology

THE microscopical features of industrial cancer depend upon the stage of advancement of the growths. At first, there is present on the skin follicular dermatitis or keratoderma composed of small, warty nodules. At this stage, the pathology is merely that of any form of keratosis, namely a marked thickening of the horny layer of the skin with hyperkeratosis. Later, there develops an atypical growth of epithelioma with projection of finger-like processes into the dermis. Most occupational cancers are carcinomatous in structure when fully developed. In a series of 1477 fatal cases of malignancy of the scrotum, Henry[29] noted that only 12 were sarcomas and one was a teratoma. The histological picture is usually that of prickle-cell epithelioma, and is rarely of the basal-cell type.

Symptomatology

THE symptoms of industrial cancer are few. In most instances, the patient merely observes that there is an eruption present on some part of his body. This is frequently overlooked until one or several of the nodules enlarge or ulcerate. Accordingly, if not properly supervised, the average worker does not report the presence of a malignant growth until that growth has attained a fairly large size. Of course, in those industries in which there is known to be an increased incidence of cancer, frequent examinations of the workers often lead to an early detection of the growths with the institution of prompt therapeutic measures.

Medicolegal Aspects

THE relationship of cancer to trauma has become a very important legal problem. The criteria advanced by Ewing[30] are very helpful in making an analysis of the traumatic origin of any tumor:

1. The authenticity and adequacy of the trauma. The mere proof that an injury was inflicted upon a certain tissue is not sufficient but should be accompanied by evidence showing that the injury was sufficient to cause some structural change or reaction.
2. The previous integrity of the wounded part. This is very difficult to prove unless supported by recent medical examination.
3. The tumor must arise at the point of injury.
4. A reasonable time limit must be observed between injury and the appearance of the tumor. Most tumors do not appear until a lapse of at least several weeks from the time of injury. This of course permits the inclusion of many extraneous factors which may have occurred in this time interval.
5. The positive diagnosis of the presence and nature of the tumor is essential. While clinical diagnosis is of value, the histological nature of the growth must be verified.

These five points are important from a medical standpoint but there also are certain legal phases to be taken into consideration. Rubinstein and Levy[31] recently made an excellent review of a number of leading workmen's compensation cases which involve cancer. They divide the cases into two legal types. In the first type of case, it is claimed that the injury caused the cancer, while in the second type, it is claimed that the injury aggravated and accelerated the pre-existing cancer. The essential difference between these two types of cases is that in the first type, the cancer is non-existent before the injury occurred; while in the second type, the cancer is definitely known to exist before the injury happened. Because of this difference, there is a general rule of law applicable to each. In the first type, the law is that where "a normal healthy individual receives an injury by accident in the course of and arising out of his employment and thereafter his health steadily declines and a cancerous condition in the vicinity of the injury thereafter causes the disability or death of the employee, the causal connection between the injury and the cancerous condition is established and the disability or death is compensable." A condensation of this ruling reveals that in order to prove that cancer is an "accidental injury" under the workmen's compensation act in the first type of case, the following four elements must be present in each case:

(Injury Caused the Cancer)

1. Serious injury or strain.
2. Physical causal connection between the injury and disability or death.
3. Proper lapse of time between the injury and the disability or death.
4. Employee free from cancer at the time of injury.

In the second type of case, the law is that "if pre-existing cancer is the lone and sole cause of the disability or death of the injured workmen, then there is no liability for workmen's compensation; but where the injury directly aggravates and accelerates the pre-existing cancer, and the injury materially contributes to speed the progress of this disease to its culmination in disability or death, then there is liability for compensation." A restatement of this rule reveals that in order to prove that cancer is an "accidental injury" in the second type of case, the following four elements must be present in each case:

(Injury Aggravated and Accelerated the Pre-Existing Cancer)

1. Ordinary type of injury.
2. Physical causal connection between the injury and the disability or death.

3. Proper lapse of time between the injury and disability or death.

4. Employee suffering from dormant or active cancer at the time of injury.

Treatment

THE treatment of occupational cancer should be directed along two lines; namely, preventive and curative therapy.

PROPHYLAXIS:

Preventive measures should be employed in the industries mentioned in order to minimize the exposure to the oils, tars and other chemicals. The simple routine of frequent bathing by the worker as well as regular laundering of the clothing is important, and includes the availability of showers, wash basins, good soaps and preventive oils such as cottonseed and olive oil and emollients. Naturally, the wearing of clothing saturated with petroleum, tar and heavy oils for a longer time than is necessary will provoke skin eruptions. Newer is the so-called invisible skin for the hands and other parts to protect them against all irritants. Such preparations are essentially mixtures of sodium stearate, silicate, glycerin, water and starch and may be quickly applied to any portion of the body. They form a light, thin film, protective for at least eight hours of continued subjection to irritants and are easily removed by washing with water. The application of bland ointments before work in order to block up the pores may prevent the lodgment of dust and oils. Thorough cleansing is necessary afterwards.

One important advance in preventive medicine lies in the solution of the employment problem. Applicants for positions in which there is continuous contact with possible carcinogenic agents should be carefully examined for the presence of any existing skin or allergic conditions. The history or presence of pruritus, eczema, xeroderma, folliculitis, keratoderma or similar states should be carefully noted, and hay fever, asthma, urticaria and other allergic states should be carefully considered. If these conditions are extensive, the applicant should be rejected. The subsequent development of allied hypersensitive reactions in this type of individual is all too frequent.

CURATIVE:

As in all forms of cancer, treatment which is effective must be instituted early and thoroughly. In the presence of follicular dermatitis or of keratoderma, the institution of cleansing measures and bland local remedies may be effective. If not, a change in the type of occupation may be necessary but the patient should be kept under observation. In the more chronic eczematoid states, roentgenotherapy may be of value. Where actual keratoses have developed, or have begun to enlarge or ulcerate, radical therapy is indicated. Complete surgical excision or electrosurgical destruction and roentgen or radium therapy may be necessary, depending on the type, nature and location of the growth. But in all cases, it should again be emphasized that adequate preventive measures and prompt therapy will effect a noticeable reduction in the incidence of occupational cancer.

Conclusion

IN 1935, Ewing[30] stated: "The interpretation of compensation law should recognize that trauma is never the sole cause of cancer, and often only a subordinate, although determining cause, that the probability of coincidence is very great, that aggravation by injury is rare and difficult to establish, and that many difficulties and uncertainties will surround this subject for a long time to come. Some form of partial liability seems necessary to meet these conditions. Without it the compensation law becomes a form of sickness insurance against the natural occurrence and ordinary consequences of one of the major causes of disability and 10% of the deaths."

Changes have been made in the compensation act which take care of part of this eventuality. Changes are being made in many of the industries which will safeguard the welfare and lives of the workers. With further knowledge and study of the subject of occupational cancer, the gradual elimination of this "scourge of the ages" from the top ranks of death producing industrial diseases should be accomplished.

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Dissecting Aneurysm of the Aorta

—Evaluation of the Role of Exertion in Its Production—

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ALL authorities agree that the basic underlying cause of dissecting aneurysm of the aorta is degenerative changes in the media of the aorta. This degeneration may be more or less diffuse or localized. According to Shennan,[1] "The diffuse alterations include fatty and atrophic changes in the muscle, frequently with complete disappearance of the fibres in small areas of the wall; hyaline and mucoid degeneration of the connective tissue with occasional deposit of calcareous salts; swelling, varicosity, fragmentation, and loss of staining power of the elastic laminae. The more local changes are the development of 'faults' in the media either parallel to the laminae or crossing them, sometimes traversing the whole thickness of the coat."

The above pathological findings are determined objectively. However, the immediate aggravating or inciting cause is more theoretical in nature. Most authors have expressed opinions that exertion, mental or physical, resulting in sudden rise of blood pressure, is the usual precipitating cause. Shennan, for instance, in his extensive monograph on the subject of dissecting aneurysm of the aorta,[1] concludes, "This sudden rise (i.e., blood pressure) has to be regarded only as the immediately exciting cause of the primary rupture—the 'auslosendes moment' of the dissecting aneurysm." McGeachy and Paullin state,[2] "In most cases this force (i.e., the break through the intima) is supplied by the already present hypertension and supplemented by an additional rise in pressure due to exertion. This last feature is often 'the straw that breaks the camel's back'." Kilgore states,[3] "Symptoms may begin when the patient is at rest, or more commonly, during exertion, which, however, may not be great." These are only a few of similar statements to be found in the literature on the subject.

Despite the weight of the above authorities, there has been no careful interpretation of the role played by exertion in the production of dissecting aneurysm of the aorta. It would seem that mere repetition of this theory, rather than a clear evaluation of the facts, has been sufficient to establish exertion as a causative factor. It was, therefore, in an attempt to make this evaluation that a review of some of the cases in the English literature was made and analyzed herein. The method and conclusions are similar to those of Master, Jaffe, and Dack,[4] who, by analysis of their cases of coronary occlusion, disproved any causal relationship between exertion and the onset of coronary occlusion. Cases of coronary occlusion are so numerous that large numbers could be reviewed from personal experience, while, on the other hand, cases of dissecting aneurysm are sufficiently infrequent to make the cases of one observer insufficient in number for analysis, so that those reported in the literature are necessarily used here.

From a diagnostic standpoint it is of importance to clarify the question of the inciting cause of dissecting aneurysms; incorrect conception may occasionally lead to a wrong or missed diagnosis. For example, the following statement was noted in the literature in the discussion of a case: "In the absence of severe physical strain or trauma, the dissecting aneurysm could not have been suspected." The cases reviewed below will indicate that the lack of such history should have played no part in the ability of the clinician to diagnose a dissecting aneurysm.

From the medicolegal viewpoint it is of even greater importance to determine whether exertion is a factor in producing dissecting aneurysms. In such cases, while both plaintiff and defendant may agree that the basic cause of the aneurysm has been degenerative changes in the media, unrelated to occupation, and that the alleged exertion played no decisive role in the production of the aneurysm, nevertheless in most instances if exertion is granted as playing any part at all the whole claim may be allowed, rather than a proportionate part. The principle involved here is the so-called "aggravation of a pre-existing condition." And since such claims will usually be death claims in which the awards of $5,000 to $6,000 may be involved, the determination of whether "aggravation of a pre-existing condition" did occur, assumes considerable importance. Our attention was directed to this problem by the following case in which the plaintiff sued the compensation insurance carrier for the full death benefit, alleging that the dissecting aneurysm was directly the result of the work being performed by the deceased at the time of the onset of his symptoms. This case has not been reported previously.

From the Department of Medicine, Golden State Hospital, Los Angeles, California.

CASE: A white (American) married male plasterer, aged 54, while standing on a six-foot high wooden scaffold, plastering a wall, experienced a sudden sharp pain in his throat with subsequent radiation to his chest, down both arms to the fingers, and to his mid-dorsal and lower dorsal back areas. At the time of the onset he was engaged in no unusual exertion; he was reaching out a few feet to spread a moderate amount of plaster from his trowel. He had been employed at this type of work for many years. About an hour later he was brought home and went to bed. A physician was called who administered morphine sulphate, gr. ½, after which the patient experienced some relief of his severe pain. Recurrence of the severe discomfort occurred early the next morning and the physician again administered morphine. About noon the compensation insurance carrier was notified that the illness was alleged to be the result of the patient's work. We were asked to examine the patient, but before our arrival he had expired. This was about 24 hours after the onset of his original pain. No details of the physical examination were obtainable except that the heart sounds were said to be faint. No blood pressure readings had been recorded. At the autopsy performed by the coroner, the deceased was seen to be a rather slight but moderately well-developed male appearing to be about the stated age. There was demonstrated a transverse break in the intima of the aorta about 0.5 cm. in length, 1 cm. above the aortic valve, through which blood had dissected into the media. This medial dissection extended along the entire thoracic aorta and along the abdominal aorta to the left iliac artery. There had also been dissection into the media of the left carotid artery. About 200 cc. of blood had ruptured into the pericardial sac. Degenerative changes in the media at the site of the break were demonstrated microscopically.

IN addition to cases seen at our clinic, there were found in the English literature, from 1921 to 1940, inclusive, 77 cases (five to 43, incl.) with adequate data concerning activities of the patient at the onset of his symptoms. Supplementing these there were 81 cases which could not be used here because they contained no definite information concerning this phase of the subject. Too frequently this portion of the history would be on the order of the following: "The woman (aged 62) developed severe pain very suddenly about three hours before admission." Such a history is for purposes of this investigation and for medicolegal purposes valueless. Parenthetically, it may be urged that in all cases in which medicolegal controversy is even remotely possible, details concerning the exact type of work being done and whether or not it was unusual should be noted. Analysis of the 77 cases, all of which were proved at autopsy, reveals the facts which are tabulated in Chart I.

CHART I.

Activity at Time of Onset	Number of Cases	Percentage of Total
Sitting	8	10.4
Standing	8	10.4
Walking	6	7.8
Mild exertion	10	12.9
Moderate exertion	10	12.9
Heavy exertion	2	2.6
Unusual exertion	1	1.3
While in bed (not stated whether asleep)	10	12.9
Awakened from sleep	4	5.2
During or within a few hours of meals (otherwise no activity)	9	11.7
Miscellaneous activities	9	11.7
Total	77	99.8

In the list of mild exertion were included such activities as light housework, curling a patron's hair, making a bed, stepping into an ice wagon, dressing, putting on an overcoat, reaching up to put in an electric light bulb, and leaning over a table. Under moderate exertion were included activities such as bending over to fix a pipe, picking up a box from the floor, delivering a sermon, drawing a bucket of water from a well, sweeping stairs, carrying a pail of coals, going on a squirrel hunt, and walking up a stairway. Under heavy exertion were included a hod carrier who collapsed while at work, and a patient who lifted a heavy object while at home. The case of unusual exertion occurred while reining in two "green" horses. Of those whose symptoms occurred while they were in bed, one had had an old dissecting aneurysm with the symptoms said to have followed a heavy meal, but the fresh one occurred without exertion and the patient expired suddenly in bed. Three others listed as having the onset while "in bed" were hospitalized with symptoms of heart failure, and another of this group had had a slight fall on slippery pavement six or seven hours before without experiencing any discomfort at that time. One listed as standing had had a heavy meal not long before the onset and had about 10 minutes before carried a heavy pail 30 yards. The miscellaneous group contains some in which the activity at the time of the onset would seem possibly to have some influence on the development of the aneurysm when considered individually, and yet their percentage of the total number is small. Included in this group are: One in whom the onset occurred shortly after a fit of rage, one after the administration of an emetic, one after a paroxysm of coughing, one during sexual intercourse, one during and one just after defecation, one during micturition, and one seven months pregnant, but in bed and not in labor. The ninth in this miscellaneous group is one in whom the aneurysm, discovered at autopsy following death from another cause, was attributed to a crushing injury to the chest five years before. While the proof in this latter case is poor, we believe that it is only in cases of this type in which severe crushing blows or severe falls have occurred that trauma may play a part in initiating the dissecting aneurysm. This can occur, however, only if degenerative medial changes are present; in an aorta with normal walls rupture might take place, but not medial dissection.

It is apparent from Chart I that no unusual predominance of cases with onset during exertion is present. The percentage of cases whose onset occurred during the various activities listed corresponds closely enough with the portions of the 24-hour day normally spent in such activities to indicate that the onset of these cases was only coincidentally related to these various forms of exertion or lack of exertion. If all those occurring with mild, moderate, heavy, or unusual exertion are totalled, the number of cases is 22, or 29.7% of the total. This figure corresponds quite

closely with the normal percentage of the 24 hours expended in activity of this sort. The percentage whose onset took place within a few hours after meals is not unusual, inasmuch as 25% of the day is so spent when one allows three two-hour periods for meals. Therefore, although perhaps not entirely conclusive, the wide variation in activities at the time of onset of these 77 cases certainly shows that exertion is not necessary to precipitate a dissecting aneurysm, and that it usually plays no role in its production.

Shennan[1] made no statistical breakdown of the occurrence of physical or mental exertion at the onset of the cases which he reviewed. Quite a few instances of severe, considerable, and slight strains were mentioned, but their number out of the 280 cases reviewed by him appears to be statistically small and would more logically be interpreted as coincidental rather than precipitating circumstances. Of his own 17 cases, in which histories were given in detail, exertion of any sort, including incidents within 12 hours of the onset, was noted in only six of the 17 cases. McGeachy and Paullin,[2] in reviewing 127 cases from the English literature, found exertion at the time of onset mentioned in only 33 cases, or 26%, which corresponds rather closely with the 29.7% in our reviewed series.

Again, if exertion does play a significant role in producing a dissecting aneurysm, one might expect a high incidence of those engaged in strenuous work in the list of cases reviewed. That such is not true is indicated by the list of occupations in 42 of the above reviewed 77 cases. The remaining 35 did not have their occupations listed. As may be seen by the following rough grouping, 26 of the 42, or 62%, were engaged in occupations ordinarily requiring only slight physical activity, while 16, or 38%, were employed in more strenuous occupations:

Occupations Requiring Average Activity	Occupations Requiring Strenuous Activity
5 unemployed or retired	3 laborers
5 housewives	2 engineers
3 business men	1 sheet metal worker
2 lawyers	1 joiner
2 physicians	1 bricklayer
2 salesmen	1 truck driver
1 cashier	1 ice wagon driver
1 clerk	1 plasterer
1 motorman	1 hod carrier
1 clergyman	1 railroad fireman
1 hair dresser	1 police constable
1 school boy	1 railroad porter
1 watchmaker	1 bell hanger
26 or 62%	16 or 38%

CONCLUSION: (1) The basic cause of dissecting aneurysm of the aorta is degenerative changes in the media.

2. From a statistical review of the histories of 77 cases it appears that exertion is not a necessary precipitating factor in the production of a dissecting aneurysm. Exertion, when it does occur at the time of onset, is probably only coincidental.

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Industrial Accidents and Diseases

Review by
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ALTHOUGH delayed for nearly a year after events recorded, at least before a copy reached our hand, this compact orange-covered report of 188 pages is packed with information, theories and stray opinions—some sizzling—and of things interesting to industrial physicians, surgeons, hygienists, and, let us say, industrial health economists in general. It relates the activities and discussions of government personnel and some others as voiced at the 27th Annual Convention of the International Association of Industrial Accident Boards and Commissions, held at Richmond, Virginia, September 9-12, 1940. During this 27-year period, outstanding men have been presidents of the Association and equally important men as secretary-treasurers—the real hard-working executive officers, notably, RICHARD L. DRAKE (1914-1915), L. A. TARRELL (1915-1916), ROYAL MEEKER (1916-1920), CHAS. H. VERRILL (1920), ETHELBERT STEWART (1921-1932), CHAS. E. BALDWIN (1932-1934), and VERNE A. ZIMMER (1936 to date).

W. H. NICKELS, JR., Virginia, was President of the 1940 Convention and introduced the subject matter under four headings: (1) Administration and procedure; (2) legal and legislative subjects; (3) state funds, medical attention and rehabilitation; and (4) miscellaneous subjects. He stressed that the first essential duty of a competent state commission is to furnish certain, prompt and reasonable compensation to injured employes, and that "substantial justice" is the type used for the reason that there is no specific formula for evaluating injuries. A summary hearing constitutes one free of technicalities and the legal refinements and endless rules of other procedures. We do need to know much about factual analysis and the weight of evidence. Appeals should go direct to the court of last resort. Preventing accidents is of far greater importance than the payment of benefits. The intangible costs are four times as great as the tangible costs of accidents. A reduction in both frequency and severity will produce a corresponding saving.

MR. ZIMMER reported that the membership in the Association consisted of 42 active and 26 associate members (memberships usually being whole departments or organizations). The Appendix shows, in addition to honorary life members, that active members represent federal departments and most of the States and Canadian Provinces (with conspicuous absences of some great industrial states), while associate members comprise chiefly companies or individuals interested in liability insurance and a few others.

The component papers and discussion are far too extensive for review in the space at hand, but their general character can be seen from the titles and remarks below.

"Means for Assuring Prompt Payment of Non-Contested Claims," by RALPH R. BOYER, Director, Division of Workmen's Compensation, New York Department of Labor; "Means for Expediting Adjudication of Contested Cases," by MRS. ANNA S. TUSANT, Chairman, Massachusetts Department of Industrial Accidents; and "Compensation Payments Pending Appeal," by DR. JAMES A. DONAHUE, Connecticut Board of Compensation Commissioners, occupied the first afternoon session (September 9). One appreciates the vast amount of work which falls to the lot of each compensation commissioner in evaluating and passing upon claims for which each must be responsible for upwards of hundreds per week.

THE second session (September 10) encompassed "The Need for Simplicity of Procedure in Workmen's Compensation," by C. K. NEWCOMBE, Manitoba Commission, who introduced a bit of humor by referring to the plaint of the English peasant, Piers the Plowman, written 600 years ago: "Law is so lordly it listeneth to few," while Mr. Justice Darling, the wit of the English common law courts, said: "Law is open to all, like the Ritz Hotel." There followed an extensive and weighty paper by I. S. FALK, Director, Bureau of Research and Statistics, Social Security Board, on "Relationships of Proposed Social Security Disability Insurance to Workmen's Compensation Systems," in which features of the Wagner Health Bill and the Capper Health Insurance Bill are the meat of discussion, with the general conclusion that—"The form which general disability insurance against temporary or permanent disability, or both, is to take in this country is still in the discussion stage. If it is possible to find a sound and practical solution of the problems involved, before some bill becomes law, our gain will be great." In the discussion of this paper, fireworks began, chiefly between MR. WISNIOSKI, of the Massachusetts Department of Industrial Accidents, and Secretary-Treasurer ZIMMER on failure to include the Murray Industrial Hygiene Bill (Senate Bill 3461, 1940), still pending in Congress, which might offer opportunity for the Federal Department of

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Labor to encroach on the field of state departments, the means being chiefly appropriation of funds to supplement or extend state efforts for the control of industrial health hazards. The discussion waxed so hot on this point that a special evening session was voted which took place on the same day (see below). This session closed with a discussion opened by MR. ZIMMER on "The Problem of Alien Dependent Awards under War Conditions in Europe." The Secretary of the Treasury has ruled that no funds can be sent to dependents in countries that have been recently conquered by Hitler. One discussant (MR. SAYER, New York) mentioned that American industry might thus be called upon to aid the Axis powers in Europe to wage economic war in America. The whole question, in dollars and cents, does not amount to a great deal.

THE evening session, devoted to the Murray Industrial Hygiene Bill, was chiefly a tilt between MR. WISNIOSKI, who thought the Bill should have been on the program, and MR. ZIMMER, who thought not. This bill has considerable similarity to the Social Security Act of 1936 for which, says MR. ZIMMER, Congress appropriated "$8,000,000 to be devoted to public health work," with "nothing said about industrial hygiene or work conditions; it was public health." Yet the state departments of labor (or similar title) in all states but one (which has no labor laws) are required to enforce laws relating to health, safety and work conditions in places of employment. MR. ZIMMER has "thought, and labor in this country today (thinks), that the place for industrial hygiene bureaus is in the state labor department, or the agency charged with the enforcement of labor laws." Hence, the "22 or 23 industrial hygiene bureaus set up in state health departments . . . are not entirely satisfactory to the labor administrators, in some states very definitely unsatisfactory," because, "These administrators . . . say they cannot always get that industrial hygiene unit to send technicians into plants to determine what the exposure is, whether or not the plants are operating within the regulations of their State so far as toxic substances and dust hazards are concerned, and that these agencies in the public health units devote themselves largely to research," and "that almost uniformly physicians attached to the industrial hygiene units and the public health services in the states refuse to come into any kind of a workmen's compensation case." In some states, the statute provides that no findings of the industrial hygiene bureaus shall be made available in any workmen's compensation case or claim. "How is the claimant going to bring in proof that his occupational disease disability resulted from his employment if he cannot produce any evidence of atmospheric contaminants, solvents or solutions existing in the place where he worked?" This was solved in New York (MR. ZIMMER) by adjourning cases until the industrial hygiene bureau (of the State Labor Department) sent a chemist, an engineer or a physician to determine the exposure and so report. The Murray Bill provides, among other things, for financial participation by the state, and administration of the plan by the state department of labor or other agency charged with the general administration of the labor laws of the state. Still, the fear of undue Federal influence, emphatically denied by MR. ZIMMER, crept out in the discussion. MR. WISNIOSKI insisted that every conceivable industrial disease was recognized in Massachusetts and compensation paid, and that they did not need any funds from the Labor Department or the Secretary of Labor to help adjudicate cases. MR. JAMES A. WHITE (Ohio) who said they heard about 187,000 cases a year, of which only about 3% come before the Commission on a contest, thought the situation was similar to another bill, Aid for the Aged, in which a row occurred which had not yet been settled, but Ohio went down in her pocket and paid the difference in order to carry the aid for the aged through the winter. "In Ohio, we do not need it" (i. e. Federal subsidy).—A motion was made to approve the Murray Bill but it failed because of a second.

THE morning session of September 11 considered "Measurement of Permanent Disabilities," with MR. WM. H. CHESTNUT, Pennsylvania, presiding. The first speaker was DR. RAPHAEL LEWY, who has now served 27 years as Chief Medical Consultant of the New York staff, and whom MR. ZIMMER introduced as dean of all the medical examiners in the country. DR. LEWY proceeded with a running discussion and clinic upon three subjects—the spinal column, injury to the skull, and defects of the upper extremities, and stoutly opposed the prevailing procedure of assigning disabilities on parts lost as contrasted with functions lost and particularly in relation to the worker's specific vocation. He stated that in his staff they had developed a procedure in which the differences among themselves were within 5 to 10% in ascertaining disabilities. He stressed the importance of age—a young man will not suffer the permanent pathology that accrues to the person over 50. DR. H. V. STEVENSON, Virginia Department of Workmen's Compensation, took up the cudgel, feeling that eventually all states may make their evaluations of loss of use on a man's general loss of earning capacity and not on specific disability. He showed clinical cases—an old man of 66 with an upper extremity injury, and a finger case in a boy—inviting DR. LEWY to judge the disability present in both, as well as distributing blank slips to other surgeons present to give their evaluations. (This whole discussion is most interesting and should be read by the interested person himself). DR. HARRY V. SPAULDING, Liberty Mutual Insurance Company, next read a paper on the same subject (The Measurement of Permanent Disabilities) and introduced a proposed scheme of terminology of functional losses, structural losses and cosmetic disfigurements, allotting percentages for functional losses applicable to the hand and forearm (as illustrations) and also to all other joint restrictions and amputations of the upper and lower extremities. He recommended the study of the advisability of publishing "A Manual of Terminology of Functional and Structural Losses," also that the doctors of the various states should get together and recommend some uniform law. DR. LEWY thought the matter of cooperation in tests on the part of the patient was most important and that it would be very difficult to apply a mathematical point of view and that such would never be applicable. DR. DEBEL (Minnesota) said that, while it would probably be a very long time before we get all the doctors to agree on rating disabilities, it is helpful to have some method of approach so that we can begin to take the guess work out of rating through terms of a standard.

"Extraterritorial Jurisdiction," by MR. JAMES A. DAVIS (Ohio) began the State Fund Round Table, with citation and discussion of important court decisions, which was followed with much discussion and finally a resolution was unanimously carried for a report to the main body pertaining to the plan devised in the North Dakota statute.

A general discussion next followed upon the question: "Should the Administrative Expenses of State Funds Be Met by Premium Rate Loadings or Out of General Tax Funds?" Here, it was pointed out by MR. EVAN I. EVANS (Ohio) that Ohio was possibly the only state which paid its administrative expenses out of taxation, even the self-insurers paying nothing for administration except that they contribute a portion for safety and hygiene.

A GENERAL session on the morning of September 12 was devoted to the "Desirability of Self Insurance under Workmen's Compensation Systems," with an exhaustive paper by WALTER LINN, Secretary, Pennsylvania Self Insurers Association; another paper by T. A. WILSON, Chairman, North Carolina Industrial Commission, and a third by THOS. J. DONNELLY, Secretary-Treasurer, Ohio State Federation of Labor. There is a mass of factual citations in these papers, as well as some "fire" which continued into the discussions, but no action was taken and the interested reader is referred to the originals.

On the last day (September 12) a session was devoted to a Round Table on Exclusive State Funds, with a comprehensive paper by MR. MARSHALL DAWSON (Ohio) on "What Changes May Be Expected in the Very Near Future in Workmen's Compensation Laws and Administration," another by MR. EVAN I. EVANS (Ohio) on "Rate Making in State Funds," and a final one by MR. A. W. KUHFELD (North Dakota) on the "Relationship of State

Fund Administration to the Courts." Each of these papers was followed by considerable discussion.

The Convention closed with a business session and a report of the Resolutions Committee—action on the matter of extra-territorial coverage was not taken but the resolution permitted to remain in the record. Following a report of the Nominating Committee, MR. C. K. NEWCOMBE, of Manitoba, was elected President; MR. WILLIAM H. CHESTNUT, Pennsylvania, Vice-President; and MR. VERNE A. ZIMMER, of Washington, Secretary-Treasurer. There were further appointments to the Executive Committee.

Appendix A names the officers and members for 1940-1941, including honorary life members, former presidents and secretaries, and active and associate members. Appendix B—Constitution of the Association. Appendix C—List of persons who attended the 27th Annual Meeting at Richmond. This is grouped by provinces and states, including Puerto Rico. A brief index of proceedings concludes the bulletin.

In summary, it is gratifying to note that executive departments in the labor and compensation fields are sensing, more and more, the importance of health relations while continuing their relentless pursuit of the industrial accident.

Deproteinated Pancreatic Extract

—Use in Thromboangiitis Obliterans—

GEORGE S. KING, M.D.
Bay Shore, New York

WHILE thromboangiitis obliterans is never an occupational disease, still the incidence of this condition frequently complicates industrial trauma, causing a major condition as a result of a slight injury to the feet or legs, and an individual suffering from this condition may precipitate a chronic arterial occlusion into an acute thrombosis from even a trivial injury.

The therapeutic use of tissue extracts was brought to the attention of the medical profession by Frey and Kraut,[1] who prepared and studied a pancreatic extract. They reported that the injection of this extract inhibited the crural pain causing intermittent claudication. This conclusion was later substantiated by Wolffe, Findlay and Dessen[2] who also used extracts of pancreatic tissue, but Schwarzmann[3] also reported improvement in intermittent claudication following the use of muscle extract. On the other hand, Nuzum and Elliot[4] were unable to demonstrate vasodilatation in animals after intramuscular or subcutaneous injection of tissue extract. Barker, Brown and Roth,[5] as well as Duryee,[6] found intermittent claudication present in the large majority of their patients with peripheral arterial disease, and they reported a definite lessening of this symptom following the use of a pancreatic tissue extract. This substance was also used with success by Wolffe, Findlay and Dessen[2] in cases of angina pectoris and spastic colitis.

According to Frey and Kraut,[1] a depressor hormone is elaborated by and stored in the pancreas, and is excreted in an inactive state into the blood stream and then excreted in an active state by the kidneys into the urine, especially in pregnant women.

The tissue extract we have used was described by Fisher, Duryee and Wright[8] as being a colorless, saline solution of a chemically purified, protein-free, nitrogenous fraction derived from an acid-alcohol extract of beef pancreas. Physiologic tests show that it is free from insulin, histamine, and acetylcholine. It contains approximately 2.5% of solids, including 0.25% of nonprotein nitrogen, 0.9% of sodium chloride, and 0.25% of phenol as a preservative. It is adjusted to a pH of 6.5 to 6.8 It is assayed by comparing its effect with that of a standard preparation on the arterial blood pressure of anesthetized dogs. This standard preparation is of such potency that 1 cc., in a large series of dogs, gives an average lowering of arterial blood pressure equivalent to the rise in arterial blood pressure produced by 0.01 mg. of epinephrine in the same dogs.

These workers found that following one injection of deproteinated pancreatic extract, 23 of a series of 27 patients with arteriosclerosis obliterans showed an improvement (prolongation) of their claudication time, but this initial response was in most instances temporary. Following 10 or more injections of deproteinated pancreatic extract, 19 patients showed improvement in their claudication time, which was prolonged to an average of more than three times that of the control individuals, who under identical conditions received physiologic saline.

We have used this preparation in the treatment of approximately 50 cases of thromboangiitis definitely with gangrenous tendencies. Some of the cases were imminent gangrene. Most of the cases had absolutely no oscillation of the needle on oscillometric measure. One case was that of a patient I treated two years ago for gangrene of the right leg and had amputated the leg in the mid thigh. He had recurrent symptoms in the left leg with absolutely no oscillations on measurement. Under treatment he now has fair oscillation and fair circulation. His pain has ceased. Another patient in the hospital about six weeks with absolutely no oscillation on admission, and with amputation apparently only a question of days, is now pain free, has feeble oscillation but is allowed to walk about. During the past summer she daily waded for hours in and out of the sea. An elderly man had absolutely no oscillation waves in both legs but is now showing signs of improving circulation. Many other cases complaining of intermittent claudication, pain, discoloration of the legs and coldness of feet were treated. The majority of these cases had been in other hands before they came to us and all had varying diagnoses, neuritis, rheumatism, varicose veins, etc., but upon measuring their circulation with the oscillometer and taking into consideration their total symptoms, were all thromboangiitis cases with progressive tendency.

Irrespective of previous treatment they were placed upon 3 cc. of tissue extract every second or third day, and if the symptoms warranted, also, upon the negative and positive pressure boot treatment.

A positive diagnosis of thromboangiitis obliterans was made upon each patient treated in this

group of selected cases for observation as to the results obtained with deproteinated pancreatic extract. This diagnosis was based upon well authenticated history of intermittent claudication and upon the objective findings in each case which were standardized to include lowered surface temperature, discoloration of the member and practically total absence of oscillometric wave measurements, and no case was selected for treatment in this group which showed oscillometric measures in excess of one to one and a half points on the instrument. In many of the cases the oscillometric measures were practically nil.

CASE 1. Mrs. H. S. Age 52: This patient was first seen three months ago. She came in complaining of a great deal of pain in the right foot and leg and the oscillometric measurements in the right leg were practically nil. She was placed upon alternate pressure and vacuum treatment and 3 cc. of tissue extract given every third day. After about a month and a half of treatment the pains improved and the oscillometer reading returned to normal. However, as some pains in the foot continued, she was fitted with a pair of flat foot arches and placed upon injections of 10,000 units of vitamin B every three days and the alternate pressure and vacuum boot was changed to ultra short wave. She is quite normal at the present time and treatment still continues about once a week.

CASE 2. Mr. F. J. B. Age 78: This patient for the past year and a half has been having intermittent claudication; much worse in the right leg. Oscillometric measures in the right leg were nil. He was placed on boot treatment and injections of tissue extract every three days for a period of three and a half months at which time he claimed that the tissue extract caused nausea and lack of appetite. The boot treatments were continued and the tissue extract discontinued. However, in the meantime he had made a great deal of progress, in that his pains are much relieved, the color and temperature of his legs are much improved, and he is able to get around. His oscillometric measure increased to a faint pulsation of about one-half to one measure on the machine. He is able to be about for a limited time. without pain.

CASE 3. Mr. A. A. Age 72: This patient came in with gangrene of the right foot a year ago. He reached us in a condition where neither tissue extract or boot treatment were of any value and the leg was removed below the knee. Four months ago he came to us with the left leg very painful, the color and temperature very low, and practically no oscillometric action. He had a small perforating ulcer of the foot. He was placed on boot and tissue extract and his condition is very much improved. His pains have completely disappeared and what looked like a certain case for amputation has cleared up. He receives treatment about once a week.

CASE 4. Mr. R. A. Age 76: This patient came to us about four months ago, with a perforated ulcer in the left leg and one of the heel of the right foot. The foot was characteristically headed for gangrene with no oscillometric measurements. He was placed upon tissue extract and kept in bed for a period of two months with daily boot treatments. The oscillometric measurements have returned a slight degree; collateral circulation is good. He is able to be up and around and has no more pain or ulceration. The color of his leg is good. He had a history of diabetes and insulin taking for two years before he came to us, but since he has been under treatment he has shown no sugar in his urine and we discontinued his insulin. This is probably a coincidence.

CASE 5. Mr. Wm. B. Age 76: This patient complained of intermittent claudication. He was treated for neuritis and rheumatism very extensively before he came to us. His oscillometric measurement in the right leg was practically nil. He was placed on boot treatments and tissue extract for about two months. The pain and discoloration of the leg cleared up and he is now able to be about.

CASE 6. Mr. B. Age 86 years: This patient was brought into the hospital primarily for obstruction of the bladder due to an enlarged prostate, and on account of age had a suprapubic cystotomy and drainage. When he was brought in, both feet were discolored, in fact, decidedly purple. He was kept in bed and no boot treatment was administered; 3 cc. of tissue extract were given every third day. At the present time the color of his legs and toes is good; he has slight oscillometric waves in both legs. He is up and about and discharged from hospital. His cystotomy, of course, is permanent.

CASE 7. Mr. A. J. Age 65 years: This is a coronary case. This patient has had coronary disease with frequent attacks of paroxysmal tachycardia over a period of two and a half years. Under all previous treatment the differential between his systolic and diastolic pressure has never been in excess of 15 points. He ran a more or less consistent blood pressure of 190/180. He was given a course of tissue extract and while it did not affect his paroxysmal tachycardia in any respect, the differential between the systolic and diastolic blood pressure became more wildly separated. His blood pressure was reduced from 190 to about 170, and the differential to from 20 to 25 points even after tissue extract was discontinued. The attacks of tachycardia did not improve while he was taking tissue extract and he was instructed to continue quinidine, 60 grains a day, which he had previously been taking for about two years.

CASE 8. Mr. S. I. L. Age 68: This patient had endoarteritis obliterans with discoloration of the dorsum of the foot and first and second toes. Following treatment with 2.5 cc. tissue extract two times a week for three weeks, then 1.5 cc two times a week for six weeks, the foot has showed considerable improvement. The discoloration has disappeared and the sensation of pain has diminished.

CASE 9. Mrs. A. H. Age 58: This patient had hypertension with arteriosclerosis and imminent circulatory failure. Following the administration of 1.5 cc. tissue extract once a week the pain in her legs has considerably diminished but the blood pressure remains the same.

CASE 10. Mrs. I. K. Age 76: This patient had hypertension with general arteriosclerosis and arterial occlusion of both legs. Following the administration of 2 cc. tissue extract at weekly intervals the intermittent claudication practically disappeared, and following six weeks treatment all pain has ceased and patient is able to walk about without claudication.

Summary

WHETHER the experience which we have had with tissue extract is coincidental or not, the necessity for amputation in all these cases has apparently been very much reduced. Since beginning our treatment with this extract and with the use of the negative and positive pressure, we have had to operate upon but few cases. Gangrene was so pronounced in these cases that they were operated upon within 12 hours of the time they were first seen.

Many of the cases under treatment who have improved were apparently cases of imminent gangrene, which, before we instituted the treatment herein described, would undoubtedly have been considered as potential operative cases.

I am a firm believer in the efficacy of tissue extract in peripheral vascular disease if administered early and properly continued. Although we have used it in several cases of angina pectoris, the results have not been startling.

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Milestones in Industrial Medicine

—Acts and Laws of His Majesty's Province of the Massachusetts-Bay in New-England*—

A. H. WHITTAKER, M.D.,
Detroit, Michigan

A RECENT review by Dr. Hayhurst** of the Medical Tracts of Sir George Baker, published in 1818, these tracts covering a period from 1767 to 1785, reflects the uncertainty of the doctors of England concerning the cause of lead poisoning.

Sir George referred to the disease as the Endemial Colic of Devonshire. He states that the earliest accounts of the Devonshire Colic, of which he had a knowledge, occurred in Dr. William Musgrave's "Treatise on Symptomatic Arthritis," published in 1703, which he stated "was caused by unripe and sour pomace" (apple or other fruit mash) used too freely.

The tract describes the findings of an investigation into the methods used in the preparation of cider, the fact that the troughs used in grinding the apples are composed of several pieces of moor stone, clamped together with iron, and fixed by melted lead poured into interstices and chasms which "are filled up with lead" so that the apples "come immediately into contact with no small amount of this poisonous mineral." In several parts of the country it was common to line the cider-presses entirely with lead, to prevent leaking; in other places to nail lead sheets over cracks or joints, and to convey the juice from the presses in leaden pipes. The farmers also put leaden sheets into the casks to prevent the liquor from souring.

Sir George finally concluded, "in fine, it has been shewn that a solution of lead is frequently to be discovered in the cyder of Devonshire, that this is a cause sufficient to produce the Devonshire Colic cannot be controverted; and it seems to me most probable that as it is adequate to the effect, so it is the sole cause of that disease."

Immediately following the reading of the medical tracts before the College of Physicians in London, which occurred nine years after the author's death, several other pamphlets were published which supported the use of lead as the cause of colic, and other pamphlets which opposed the idea as being unsound.

The first was that which Frances Geach translated and printed in 1767. To these were added some remarks on the same subject by the Reverend Mr. Alcock, who agreed with Geach that the Baker conclusions were without supporting evidence. Both Geach and Alcock were then answered in the same year by a pamphlet written and distributed by William Saunders.

Saunders wrote in support of the Baker conclusions and agreed that Sir George had correctly diagnosed the cause of the Devonshire Colic as chronic lead poisoning. These observations, as a group, form a very interesting chapter in the study of industrial lead poisoning, and will be discussed in more detail in a subsequent paper.

In 1774 there was published in London a book by Thomas Percival, M.D., a Fellow of the Royal Society and of the Society of Antiquaries. The small book was titled "Observations and Experiments on the Poison of Lead." The book was addressed to Sir George Baker and referred to cases of poison by lead among plumbers, printers, and especially the ore workers in Derbyshire, and referred to lead tubes used for water supply and pottery.

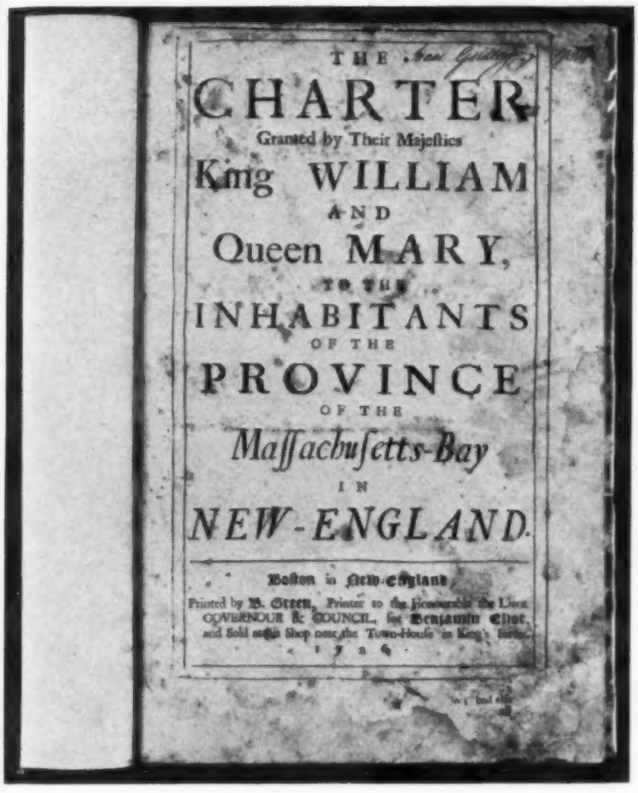
Prior to this general discussion and search for the cause of the disease, which we now know is lead poisoning, in 1759 to 1767 John Huxham had translated from the original Latin of 1738 to 1748, a description of the Devonshire Colic. The description was excellent, but the cause of the condition was not determined, the treatise being ended as follows: "These few things I have here delivered of the method of curing the Devonshire Colic may, perhaps, be properly enough applied to the cure of what is called the Colica Pistonum, which kind of disease is very common in the West Indies: And, arising from a similar cause, to wit, too great a use of the very acid juice of lemons, requires much the same method of cure."

Thus it is evident that 23 years before a description of lead poisoning occurred in the British Isles, that is, lead poisoning due to the methods used in preparation of alcoholic beverages, and almost one hundred years before lead poisoning was recognized by its true etiology in such beverages, the condition had already been recognized in the Province of Massachusetts-Bay, and a law had been established for the protection of the people.

It is interesting also to note that in 1786 Benjamin Franklin, in writing to his friend, Dr. Benjamin Vaughan, dated Philadelphia, July 31, 1786: "The first thing I remember of this kind

*The first law passed on this continent to protect the public health by controlling the process of manufacture.

**_Industrial Medicine_, June, 1941, Page 260.



THE
CHARTER
Granted by Their Majesties
King WILLIAM
AND
Queen MARY,
TO THE
INHABITANTS
OF THE
PROVINCE
OF THE
Massachusetts-Bay
IN
NEW-ENGLAND.

Boston in New-England
Printed by B. GREEN, Printer to the Honourable the Lieut. GOVERNOUR & COUNCIL, for Benjamin Eliot, and Sold at his Shop near the Town-House in King's Street.
1726.

was a general Discourse in Boston when I was a Boy, of a Complaint from North Carolina against New England Rum, that it poison'd their People giving them the Dry-Bellyach, with a Loss of the Use of their Limbs. The Distilleries being examin'd on the Occasion, it was found that several of them used leaden Still-heads and Worms, and the Physicians were of Opinion that the Mischief was occasioned by that Use of Lead. The Legislature of the Massachusetts thereupon passed an Act prohibiting under severe Penalties the Use of such Still-Heads and Worms thereafter."

A partial reproduction of the letter accompanies this discussion.

THE CHARTER GRANTED BY THEIR MAJESTIES KING WILLIAM AND QUEEN MARY TO THE INHABITANTS OF THE PROVINCE OF THE MASSACHUSETTS-BAY IN NEW ENGLAND

BOSTON IN NEW-ENGLAND
1726

AN ACT in addition to an Act Made and Pass'd at a Session of this Court in August last, Entituled, *An Act for preventing Abuses in the Distilling of Rhum, and other Strong Liquors with Leaden Heads or Pipes.*

Whereas some Persons do presume to make use of Worms and Still Heads made of base of mix'd Mettal, notwithstanding the good and wholesome Law made to the contrary; to prevent which, and their being sent to other Parts or Places, to the Endangering His Majesty's Subjects there:

BE IT ENACTED BY THE LIEUTENANT GOVERNOUR, COUNCIL AND REPRESENTATIVES IN GENERAL COURT ASSEMBLED, AND BY THE AUTHORITY OF THE SAME, That the Sheriff of the County where the Distilling Trade is carried on, or such

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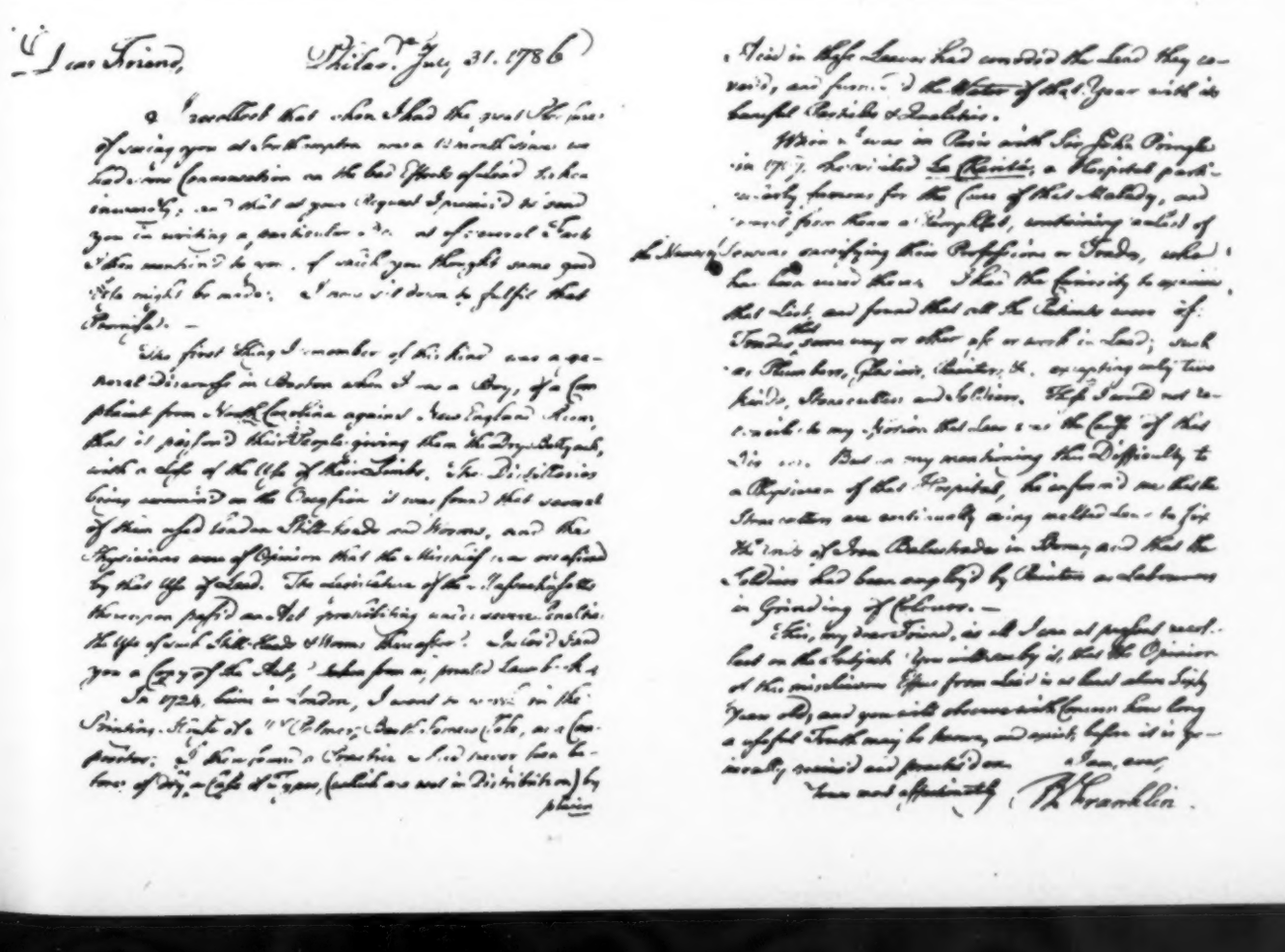


Dear Friend, Philad.a July 31. 1786

I remember that when I had the great Pleasure of seeing you at Southampton was a Month's time we had some Conversation on the bad Effects of Lead taken inwardly; and that at your Request I promised to send you in writing a Particular of the several Cases & Circumstances I then mentioned to you, of which you thought some good Use might be made. I now sit down to fulfil that Promise.

The first thing I remember of this Kind was a general Discourse in Boston when I was a Boy, of a Complaint from North Carolina against New England Rum, that it poisoned their People, giving them the Dry-Bellyach, with a Loss of the Use of their Limbs. The Distilleries being examined on the Occasion it was found that several of them used leaden Still-heads and Worms, and the Physicians were of Opinion that the Mischief was occasioned by that Use of Lead. The Legislature of the Massachusetts thereupon passed an Act prohibiting under severe Penalties the Use of such Still-Heads & Worms thereafter. I will send you a Copy of the Act taken from a printed Law Book.

In 1724. I was in London, I used to resort in the Printing House of Mr. Palmer, near Bartholomew Close, as a Compositor. In the second Chapter I had never had to do of Dry-Gripe, Cholick &c. upon (called as such in Distinction) by plain

Acid in those Liquors had corroded the Lead they ran through, and formed the Matter of that Poison with its baneful Particles & Qualities.

When I was in Paris with Sir John Pringle in 1767. he visited the Charité, a Hospital particularly famous for the Cure of Wild Malady, and learned from them a Remedy, combining relief of the Nervous, sacrificing their Profession or Trades, called the Lead Cure. I had the Curiosity to examine that List, and found that all the Patients were of Trades, some way or other of or work in Lead; such as Plumbers, Glaziers, Painters &c. excepting only two Maids, Nurse-tenders and 6 Children. That I should not be convinced by my Reason that Lead was the Cause of that Disease. But on my mentioning this Difficulty to a Physician of that Hospital, he informed me that the Nurse-tenders are continually using melted Lead to fix the Ends of Iron Barbicades in Stone, and that the Children had been employed by Painters in Colours in Grinding of Colours. —

This, my dear Friend, is all I can at present recollect on the Subject. You will easily see that the Opinion of this mischievous Effect from Lead is not a Mad whim. Sixty Years ago, and you will observe with Concern how long a useful Truth may be known, and wish, before it is generally received and practised on, as you, and

Dear and affectionately B Franklin

other Person as he shall Depute to that Service, shall be, and are hereby fully authorized and Required, as often as there shall be Occasion, and in the Day time to Enter into any Still-house, or other House where any such Heads or Worms of Base Mettal are justly suspected to be, and wheresoever they shall be found, the same to Saw asunder and break to pieces, so as to render them entirely useless and unfit for Distilling; the Officer to be paid by the Owner of Such Head or Worm *Five Shillings*, or else to have Satisfaction out of the Mettals: And no Owner or Occupier of any Still Heads or Worms shall deny Entrance, as aforesaid, to any Officer appointed, as aforesaid, or refuse to Expose to his View, and to submit to his Operation according to the true Intent and Meaning of this Act, all the Worms and Still Heads in the Custody of such Owner or Occupier, on Penalty of forfeiting the Sum of *One Hundred Pounds*.

AND BE IT FURTHER ENACTED BY THE AUTHORITY AFORESAID, That when ever the Assay-Masters have Viewed, Tryed and Proved any Worm or Head, as aforesaid, and the Distiller or Owner thereof cannot or will not shew the Mark and Number, and produce the Certificate of it's being good and made of fine Pewter to the Officer when demanded, It shall be Deemed to be made of Base Mettal, and so by him be rendered Useless, and Destroyed.

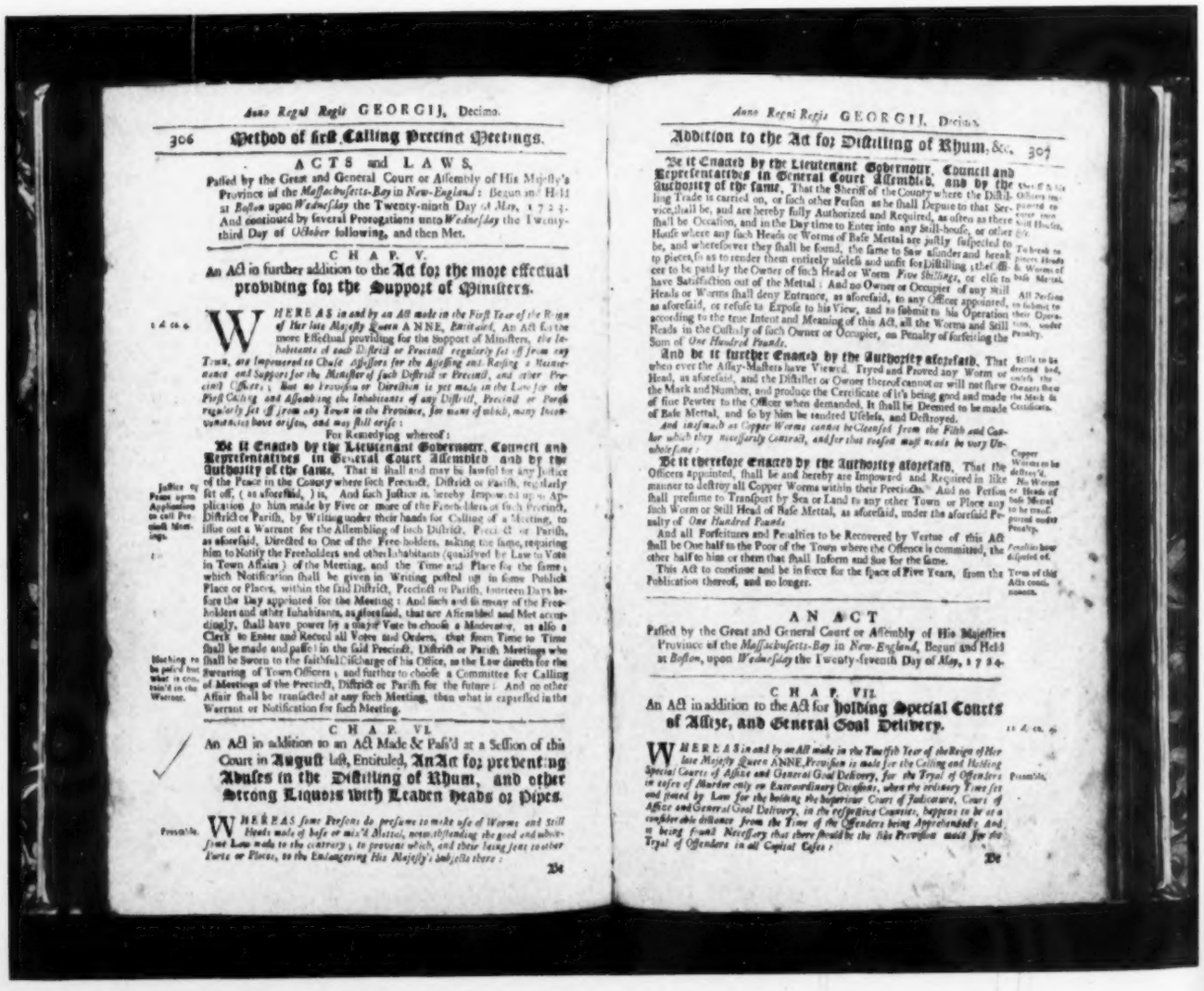
And inasmuch as Copper Worms cannot be Cleansed from the Filth and Canker which they necessarily contract, and for that reason must needs be very Unwholesome:

BE IT THEREFORE ENACTED BY THE AUTHORITY AFORESAID, That the Officers appointed, shall be and hereby are Impowered and Required in like manner to destroy all Copper Worms within their Precincts. And no Person shall presume to Transport by Sea or Land to any other Town or Place any such Worm or Still Head of Base Mettal, as aforesaid, under the aforesaid Penalty of *One Hundred Pounds*.

And all Forfeitures and Penalties to be Recovered by Vertue of this Act shall be One half to the Poor of the Town where the Offence is committed, the other half to him or them that shall Inform and Sue for the same.

This Act to Continue and be in force for the space of Five Years, from the Publication thereof, and no longer.

FROM this material it can be seen that the early American Colonies were alert to the importance of the protection of public health, were in the early 18th century already establishing laws



Anno Regni Regis GEORGII, Decimo.

306 Method of first Calling Precinct Meetings.

ACTS and LAWS,

Passed by the Great and General Court or Assembly of His Majesty's Province of the *Massachusetts-Bay* in *New-England*: Begun and Held at *Boston* upon *Wednesday* the Twenty-ninth Day of *May*, 1723. And continued by several Prorogations unto *Wednesday* the Twenty-third Day of *October* following, and then Met.

CHAP. V.

An Act in further addition to the Act for the more effectual providing for the Support of Ministers.

1 *Ann.* c. 9.

WHEREAS in and by an Act made in the First Year of the Reign of Her late Majesty Queen ANNE, Entituled, An Act for the more effectual providing for the Support of Ministers, *the Inhabitants of each District or Precinct regularly set off from any Town, are Impowered to Chuse Assessors for the Assessing and Raising a Maintenance and Support for the Minister of such District or Precinct, and other Precinct Officers; But no Provision or Direction is yet made in the Law for the First Calling and Assembling the Inhabitants of any District, Precinct or Parish regularly set off from any Town in the Province, for want of which, many Inconveniencies have arisen, and may still arise:*

For Remedying whereof:

Justice of Peace upon Application to call First Meetings.

Be it Enacted by the Lieutenant Governour, Council and Representatives in General Court Assembled and by the Authority of the same, That it shall and may be lawful for any Justice of the Peace in the County where such Precinct, District or Parish, regularly set off, (as aforesaid,) is, And such Justice is hereby Impowered upon Application to him made by Five or more of the Freeholders of such Precinct, District or Parish, by Writing under their hands for Calling of a Meeting, to issue out a Warrant for the Assembling of such District, Precinct or Parish, as aforesaid, Directed to One of the Freeholders, naming the same, requiring him to Notify the Freeholders and other Inhabitants (qualified by Law to Vote in Town Affairs) of the Meeting, and the Time and Place for the same; which Notification shall be given in Writing posted up in some Publick Place or Places, within the said District, Precinct or Parish, fourteen Days before the Day appointed for the Meeting: And such and so many of the Freeholders and other Inhabitants, as aforesaid, that are Assembled and Met accordingly, shall have power by a major Vote to choose a Moderator, as also a Clerk to Enter and Record all Votes and Orders, that from Time to Time shall be made and passed in the said Precinct, District or Parish Meetings who shall be Sworn to the faithful Discharge of his Office, as the Law directs for the Swearing of Town Officers; and further to choose a Committee for Calling of Meetings of the Precinct, District or Parish for the future: And no other Affair shall be transacted at any such Meeting, then what is expressed in the Warrant or Notification for such Meeting.

Nothing to be acted but what is contained in the Warrant.

CHAP. VI.

An Act in addition to an Act Made & Pass'd at a Session of this Court in August last, Entituled, **An Act for preventing Abuses in the Distilling of Rhum, and other Strong Liquors with Leaden Heads or Pipes.**

Preamble.

WHEREAS *some Persons do presume to make use of Worms and Still Heads made of base or mix'd Mettal, notwithstanding the good and wholesome Law made to the contrary, to prevent which, and there being sent to other Parts or Places, to the Endangering His Majesty's Subjects there:*

Be

Anno Regni Regis GEORGII, Decimo.

Addition to the Act for Distilling of Rhum, &c. 307

Be it Enacted by the Lieutenant Governour, Council and Representatives in General Court Assembled, and by the Authority of the same, That the Sheriff of the County where the Distilling Trade is carried on, or such other Person as he shall Depute to that Service, shall be, and are hereby fully Authorized and Required, as often as there shall be Occasion, and in the Day time to Enter into any Still-house, or other House where any such Heads or Worms of Base Mettal are justly suspected to be, and wheresoever they shall be found, the same to Saw asunder and break to pieces, so as to render them entirely useless and unfit for Distilling; the Officer to be paid by the Owner of such Head or Worm *Five Shillings*, or else to have Satisfaction out of the Mettal: And no Owner or Occupier of any Still Heads or Worms shall deny Entrance, as aforesaid, to any Officer appointed, as aforesaid, or refuse to Expose to his View, and to submit to his Operation according to the true Intent and Meaning of this Act, all the Worms and Still Heads in the Custody of such Owner or Occupier, on Penalty of forfeiting the Sum of *One Hundred Pounds*.

Sheriff & his Officers impowered to enter such Still Houses.

To break to pieces Heads & Worms of base Mettal.

All Persons to submit to their Operation, under Penalty.

And be it further Enacted by the Authority aforesaid, That when ever the Assay-Masters have Viewed, Tryed and Proved any Worm or Head, as aforesaid, and the Distiller or Owner thereof cannot or will not shew the Mark and Number, and produce the Certificate of it's being good and made of fine Pewter to the Officer when demanded, It shall be Deemed to be made of Base Mettal, and so by him be rendred Useless, and Destroyed.

Still to be deemed bad, unless the Owners shew the Mark & Certificate.

And inasmuch as Copper Worms cannot be Cleansed from the Filth and Canker which they necessarily Contract, and for that reason must needs be very Unwholesome:

Copper Worms to be destroyed.

Be it therefore Enacted by the Authority aforesaid, That the Officers appointed, shall be and hereby are Impowered and Required in like manner to destroy all Copper Worms within their Precincts. And no Person shall presume to Transport by Sea or Land to any other Town or Place any such Worm or Still Head of Base Mettal, as aforesaid, under the aforesaid Penalty of *One Hundred Pounds*.

No Worms or Heads of base Mettal to be transported under Penalty.

And all Forfeitures and Penalties to be Recovered by Vertue of this Act shall be One half to the Poor of the Town where the Offence is committed, the other half to him or them that shall Inform and Sue for the same.

Penalties how disposed of.

This Act to continue and be in force for the space of Five Years, from the Publication thereof, and no longer.

Term of this Act's continuance.

AN ACT

Passed by the Great and General Court or Assembly of His Majesties Province of the *Massachusetts-Bay* in *New-England*, Begun and Held at *Boston*, upon *Wednesday* the Twenty-seventh Day of *May*, 1724.

CHAP. VII.

An Act in addition to the Act for **holding Special Courts of Assize, and General Goal Delivery.**

11 *L.* c. 9.

WHEREAS in and by an Act made in the Fourth Year of the Reign of Her late Majesty Queen ANNE, *Provision is made for the Calling and Holding Special Courts of Assize and General Goal Delivery, for the Tryal of Offenders in cases of Murder only on Extraordinary Occasions, when the ordinary Times set and stated by Law for the holding the Superiour Courts of Judicature, Courts of Assize and General Goal Delivery, in the respective Counties, happens to be at a considerable distance from the Time of the Offenders being Apprehended; And it being found Necessary that there should be the like Provision made for the Tryal of Offenders in all Capital Cases:*

Preamble.

De

for the protection of the public, and the doctors and health officers, although not recognized as a public health service, were keenly interested in the cause of diseases.

The many years which followed the determination of the cause of lead poisoning, in distilling or beverage preparation in this country, before the knowledge became widespread in England, also suggests that while medical knowledge was constantly coming from Europe and England to the Colonies, very little medical knowledge was traveling in the other direction.

Placement of the Worker

T. LYLE HAZLETT, M.D.,
Professor of Industrial Hygiene, University of Pittsburgh, and President, American Association of Industrial Physicians and Surgeons, Pittsburgh

THROUGHOUT the centuries, and even up until the last quarter century, workers produced materials either by hand or by skillful manipulation of rather simple tools and machines. They learned a trade through years of training and experience and were capable of performing all the operations involved in producing a finished product.

Today, however, in our highly mechanized shops, most workmen perform only one special operation. In fact, complex machines actually do the work, while the worker applies his skill to the operating of the machines.

In the past, the workman built or formed objects in any of several ways according to his training, ability and the tools available. He selected the materials and the tools to make the object. Now, however, the materials, and the machine, and its method of operation are fixed items in the plant. Therefore, it now is necessary to select a workman who is mentally and physically capable of operating one particular machine or performing one particular operation.

As a result of these changing conditions, increased attention has been focused on the subject of the proper placement of workers in industry.

This discussion will deal with the placement of the worker from the physical standpoint, and assumes that the applicant has met the requirements of the personnel department and is presumably able to do his required work from the standpoint of mental aptitude, job experience, etc. The plan of placement should be based on the assumption that industry expects of its human maintenance department the same efficiency which it demands of all other departments. Hence, placement of the worker from the physical standpoint hinges almost entirely on pre-employment physical examination.

This has given great impetus to the study of the various problems involved in the placement of workers such as physical fitness, and job hazards. But there still remain many difficulties which require serious consideration, among them being the difficulty of convincing management that the benefits to be derived from the proper placement of workers justify the increased cost of medical and engineering supervision; and the difficulty of convincing labor organizations of the benefits accruing to the individual worker.

With the development of processes requiring contact with dusts, fumes and gases, many of which may constitute a serious health hazard, workers are entitled to know that their safety is not jeopardized by physical ill-health or impaired by fellow employees. They also are entitled to the assurance that diseases communicable in themselves, or in combination with industrial dusts or poisons, are not permitted to gain access or progress in places of employment. These are only some of the ramifications of the problems involved in the proper placement of workers.

A UNIFORM examination of all applicants has often been common practice. Thus, if a man passed the examination, he was considered physically fit to do any job—whether it was that of a spray painter, tool-room attendant or heavy furnace worker. No restrictions were placed on the foreman or the superintendent governing the transfer of a worker from one job to another. Only last summer, a man in one of our own plants was transferred from light bench work to heavy foundry work, where the temperature was very high. Within an hour he was taken to a hospital with severe heat sickness. This would not have happened if proper control by the medical department had been enforced. This is only one of many such instances which could be enumerated to emphasize the importance of the proper placement of the individual and the necessity for control of the individual at the work for which he is employed.

Pre-employment examinations should be made to determine the applicant's physical fitness for employment on a specific job within a given industry so that he may perform the work safely and efficiently. The real purpose of the examination is to fit the worker properly into the job which his physical qualifications warrant. It should not have any purpose, even as a secondary, the discarding of all those who have physical defects, but rather should be used to aid them in finding their proper place in industry. Existing compensation laws make this statement seem unfair to employers, but if the placement of the worker is thoroughly considered in the manner we suggest, the employer in most cases will be adequately protected from financial loss, because proper placement precludes acceptance of individuals who are not physically suitable for certain types of work.

No physician should consider himself competent to render a physical examination for job placement in industry unless he has a thorough knowledge of plant activities, job requirements and hazards. Where it is impossible for the physician who is required to make pre-employment examinations personally to acquaint himself with

the various job requirements, a system employing job-specification cards may be used.

An occupation card which simply states the type of work is not a job card. It may, for example, fail to mention that a certain punch-press operation requires working with materials that may affect the operator's health.

Certain information relative to individual jobs must be the responsibility of the medical department, while the remainder is furnished by the employment department and the shop. It all may be correlated by the employment office, thereby giving the interviewers the information they need relative to the requirements of each particular job.

Much information on the job card is not necessarily of value to the examining physician, but it does afford him an opportunity to acquire complete knowledge of the jobs.

A complete set of job cards should be maintained in the employment, production and medical departments. Those of the medical department contain much additional information of a purely medical nature, and an increasing amount of information relative to toxicity of many substances used in industry is becoming available to the physicians from many sources.

The type of pre-employment examination required, and the type and frequency of periodic examination, the materials used, and a description of the work and actual job conditions are shown on the card. This information gives the physician an intimate knowledge of the protective equipment, and at times he may wish to recommend additional protective equipment. With such a card, the types of examinations readily can be assigned, and transfers controlled from the medical standpoint so that no man will be transferred to a job requiring a different pre-employment examination without the consent of the physician responsible for the workers in the plant.

FOR the pre-employment examination a short personal history is desirable. Often the information contained in the medical history is not correct, but the occupational history can be more accurately obtained, and after all, this is the most important. There is no justification for placing a worker already carrying an excess amount of lead in his system on a job where he will be exposed further to lead, even though the job is well protected and he will not receive any hazardous concentrations. If anything should happen he will feel his present job is responsible, and immediately he becomes a liability suffering from loss of earning power, as well as a compensation problem for the employer.

The worker's occupational history should record all jobs back to his first one. Otherwise, a condition that is relatively unimportant may be construed as being serious. For example, a young high school graduate showing a marked pneumoconiosis had worked one summer as a coal loader. Without this information he might have been rejected for employment.

Classification of the examinations will depend on the particular industry. In a fabricating industry there may be need for four types of examination. Examination No. 1 would be the basic physical examination with which we all are familiar. It may include a fluoroscopic examination, chest x-ray and a Wassermann. Examination No. 2 would include x-ray of the chest, as it is necessary for the so-called dusty occupations such as porcelain work, foundry work and so forth. Examination No. 3 calls for a complete blood examination as it is given for that class of jobs which have to do with heavy metals, solvents, chlorinated compounds and so forth. It may include many special tests, such as lead quantitative urines, urine sulphate test for benzol, and so on. Examination No. 4 is for particular attention to the skin and requires a patch test. It is given to those who will have contact with paints, solvents, resins, acids and the like.

If we can have such types of physical pre-employment examinations, we not only are practicing preventive medicine, but we are placing the individual on work for which he is suited, and are giving industrial management the proper application of medicine to the employment problem.

It is customary for applicants to be classified as A, B, C, or as A, B, C, and D—according to their suitability for employment rather than as the basis of their fitness for specific jobs. We are now extending the scale of fitness to individual jobs. And with an intimate knowledge of the jobs, we are able to place many workers formerly thought unfit for any job, thus contributing to our democratic form of government by providing gainful occupations for all individuals.

IN the examination procedure, the individual is given a form which he takes to the examining physician. On it is given the type of job and the type of physical examination. If he is approved by the medical department, the form is completed and taken by the applicant to the head of the department in which he is to be employed. If the applicant cannot pass the required physical examination, he returns to the employment department with a statement of the type of work he may safely do—or that he is physically unfit for any type of work.

Such a system of placement is a most definite economic gain, both to the workers and to management, by decreasing the incidence of occupational injuries and non-occupational illnesses.

The application of medicine in industry is only beginning, and it is most fascinating to all interested in human welfare. As physicians we should accept to the fullest extent this field of preventive medicine, for no field in medicine today offers greater opportunities for clinical and research work than the relation between occupation and health. In this industrial age, with an ever-increasing change in our daily lives resulting from constant new developments in the chemical and physical fields, this branch of medicine will have a most direct effect on the well being of our fellow workers in industry and on our maintaining the American way of living.

Industrial Health

—Symposium on Industrial Health held at the Medical College of Virginia, Richmond, Virginia, on September 11 and 12, 1941—

Reported by

C. O. SAPPINGTON, M.D., DR. P.H.

SPONSORED by the Committee on Industrial Health of the Medical Society of Virginia, the Bureau of Industrial Hygiene of the Virginia State Health Department, and the Richmond Academy of Medicine, with the cooperation of the Virginia Manufacturers Association and the Richmond Chamber of Commerce, the second SYMPOSIUM ON INDUSTRIAL HEALTH of the Department of Preventive Medicine of the Medical College of Virginia, at Richmond, was held September 11 and 12, 1941.

Special features consisted of a group of presentations on industrial ophthalmology and hand injuries. Other subjects were related to tuberculosis, respiratory diseases and air conditions, dermatoses, first aid, placement, with various authorities from different parts of the country participating.

The program follows:

Thursday Morning: September 11

WILLIAM H. HIGGINS, M.D., Professor of Clinical Medicine, presiding:

1. "The Medical Society of Virginia's Program for Industrial Health"—WALTER B. MARTIN, M.D., President, Medical Society of Virginia, Norfolk.
2. "The State Board of Health's Bureau of Industrial Hygiene: Assistance It Can Render the Industrial Physician"—J. B. PORTERFIELD, M.D., Director, Bureau of Industrial Hygiene, State Health Department, Richmond.
3. "Tuberculosis in Industry: The Use of Mass X-Raying"—E. C. HARPER, M.D., Tuberculosis Control Officer, State Health Department, Richmond.
4. "How An Industrial Physician Can and Should Cooperate with the General Practitioner"—RUSSEL R. JONES, M.D., Medical Director, Western Division, Bell Telephone Company of Pennsylvania, Pittsburgh.
5. "Respiratory Diseases and Air Conditioning"—W. J. MCCONNELL, M.D., Assistant Medical Director, Metropolitan Life Insurance Company, New York.
6. "Diagnosis, Treatment and Prevention of Industrial Dermatoses" — LOUIS SCHWARTZ, M.D., Medical Director, Office of Dermatoses Investigations, National Institute of Health, Bethesda, Maryland.

Thursday Afternoon: September 11

ROBERT H. COURTNEY, M.D., Professor of Ophthalmology, presiding:

1. "Essentials of First Aid and Later Management of Industrial Eye Injuries"—HARRY B. STONE, M.D., Roanoke, Virginia.
2. "The Handling of Chemical Burns of the Eye"—GEORGE H. CROSS, M.D., Chester, Pennsylvania.
3. "Detection and Control of Defective Vision in Industry"—RUDOLPH C. THOMASON, M.D., Assistant Professor of Ophthalmology, Medical College of Virginia, Richmond.
4. "Protective Equipment for Eyes in Industry"—C. N. SCOTT, M.D., American Viscose Corporation, Nitro, West Virginia.

Thursday Evening: September 11

FRED J. WAMPLER, M.D., Professor of Preventive Medicine, presiding:

1. "Newer Advances in the Knowledge of Nutrition"—D. FRANK MILAM, M.D., International Health Division, The Rockefeller Foundation, Chapel Hill, North Carolina.
2. "Aging as a Problem of Industrial Health"—EDWARD J. STIEGLITZ, M.D., Bethesda, Maryland.

Friday Morning: September 12

T. DEWEY DAVIS, M.D., Assistant Professor of Medicine, presiding:

1. "Medical Control of Industrial Exposure to Toxic Chemicals"—JOHN H. FOULGER, M.D., Director, Haskell Laboratory of Industrial Toxicology, Wilmington.
2. "Placement of the Worker"—T. LYLE HAZLETT, M.D., Professor of Industrial Hygiene, University of Pittsburgh, and President, American Association of Industrial Physicians and Surgeons, Pittsburgh.
3. "Backache"—H. PAGE MAUCK, M.D., Professor of Clinical Orthopedic Surgery, Medical College of Virginia, Richmond.
4. "The Selection of Heat in the Treatment of Plant Injuries"—MURRAY B. FERDERBER, M.D., Research Fellow, Department of Industrial Hygiene, School of Medicine, University of Pittsburgh, Pittsburgh.

Friday Afternoon: September 12

I. A. BIGGER, M.D., Professor of Surgery, presiding:

1. "The Evolution of Industrial Health"—PROFESSOR DONALD E. CUMMINGS, Director, Division of Industrial Hygiene, University of Colorado School of Medicine and Hospitals, and President of American Industrial Hygiene Association, Denver.

HAND INJURIES:

2. "Newer Antiseptics"—THOMAS BEATH, M.D., F.R.C.S., Associate in Surgery, Medical College of Virginia, Richmond.
3. "Importance of Purposeful Splinting Following Injuries to the Hand"—HENRY C. MARBLE, M.D., Boston.
4. "Prevention and Treatment of Hand Infections"—SUMNER L. KOCH, M.D., Associate Professor of Surgery, Northwestern University Medical School, Chicago.

Thursday Morning: September 11

DR. WALTER B. MARTIN, President of the Medical Society of Virginia, in opening the symposium, spoke on "The Medical Society of Virginia's Program for Industrial Health."

The changes from an agricultural community into an industrial state during the past two decades have produced a developmental impact on medicine, with the result that special problems are now presented. Among these are various plans for medical care in certain industries or for groups in various industrial areas. There are also peculiar defense problems, as well as the study of the special health hazards of different manufacturing plants, all of which must receive consideration by the Medical Society of Virginia.

DR. J. B. PORTERFIELD, speaking on the subject "The State Board of Health's Bureau of Industrial Hygiene —Assistance It Can Render the Industrial Physician," described the type of industrial hygiene services and emphasized their importance to the physician in industry, or the part-time physician doing industrial work. One of the most important and significant facts is that approximately 90% of the difficulty in industry is caused by illness and 10% by accidents, but much more money has been spent on the latter. Mention was also made of various x-ray surveys throughout the state, more of which would be taken up by DR. HARPER, the speaker to follow. Since the great majority of plants (about 96%) have less than 500 employees, as shown by preliminary surveys in this state, the great need is therefore obvious for the type of service rendered by the Bureau of Industrial Hygiene, both to industrial physicians and part-time private practitioners doing industrial work.

DR. E. C. HARPER, described "The Use of Mass X-Raying with Reference to Tuberculosis in Industry."

In taking histories of tuberculous suspects, it is usual to find a family history of contact. Mortality is higher in industry than in the general population in certain types of industrial groups. It should be noted, however, that the employer has no control over home conditions.

In the spring of 1941, the State Health Department purchased a 35-mm. apparatus for the purpose of taking films of the chest. The cost here is approximately 25 cents per person and the results technically have been satisfactory, according to recent experience. It takes in all about 30 minutes per person. The information has been kept confidential.

In the stemmery of a tobacco plant where 98% of the 1012 persons were x-rayed (700 whites and 312 negroes), four cases of tuberculosis were found. Of these, two advanced cases were sent to the hospital and returned to their jobs after one year; one advanced case although hospitalized left against advice in two weeks. In these people, the standard of living is quite low. The migrant worker presents the greatest problem.

Some investigators have objected to mass x-ray methods, but it is believed that this type of procedure is important chiefly on account of the fact that the examination is taken to the patient instead of waiting for the patient to come to the examiner.

Thus far mass x-ray surveys have been made in the following types of industries: Tobacco, explosives, life insurance, steel, recreation and amusement products, coal

mining, on 35-mm. film and on paper films. The results show a percentage of 0.56 cases active and 2.1% old healed tuberculosis. It is believed that by such methods approximately 50,000 more will be surveyed this year.

DR. R. R. JONES discussed the subject "How An Industrial Physician Can and Should Cooperate with the General Practitioner."

The doctor of medicine has been brought into industry by the shrewdness of the industrialist, and still holds his job because of economics, in some quarters.

The speaker was called into an industrial group on a part-time basis after 20 years of private practice. In this group there are approximately 8000 employees. It is believed that the employee should have a free choice of physician, so time has been devoted in this organization to group problems. There is a great deal to be done with reference to adaptation to the job; as an example, it has been found that tall thin men did rather poor work and had back trouble when digging pole holes.

Experience shows in this organization that most of the trouble occurs with the women, who comprise 85% of the total payroll. Most of the difficulty occurs in the 20% of underweights, although this does not include tuberculosis.

With reference to persons who report sick, it is the duty of the department to find out what the difficulty is through a thorough diagnostic regime. The diagnostic service is available to private physicians, about half the work being of this type.

Industry is sometimes asked how it can afford the cost of such a service. As an answer to this, and as an example, it was found in an outlying office that there were 18 cases of tuberculosis on the first survey, and 24 the next year. This was accomplished by making use of the factor of poor attendance as the only lead. During the last 16 years there has been established an excellent record, as two cases a year are now considered excessive. The job is waiting after recovery for each person, and the individual is checked with stereo films during the rest of the employment period.

In summarizing his ideas with reference to the relationship between the general practitioner and the industrial physician, the following opinions were cited by the speaker:

1. The medical adviser to industry should not have any remedial function—it should be advisory only.
2. The medical adviser should cooperate with the private practitioner through consultations, both written and verbal.
3. The medical adviser in industry should not receive patients who are employees of the group.
4. He should be guided by the best interests of the employee and not be a party to the discharge proceedings.
5. He should be obligated to decide all issues for the benefit of the employee, and should explain carefully what the decision means and how it came about.
6. There shoud be a code of ethics between the industrial and the private physician, and this code should be observed the same as other ethical codes.
7. The medical adviser in industry should not be an officer of the company and should not be expected to discipline employees in any way.
8. It is understood of course that all of the foregoing does not apply to compensation cases, with reference to remedial work, which in most states is required by law.

The speaker had seen only one case of so-called "chiseling" in the 20 years of his experience, and in that case the medical adviser himself backed the decision made by the personal physician of the employee concerned.

DR. W. J. McCONNELL presented the subject "Respiratory Diseases and Air Conditioning."

Approximately 50% of lost-time cases are due to upper respiratory diseases. Hence the need for concentration on respiratory diseases because of prevalence and losses resulting from them. The speaker was convinced that adequate and proper maintenance of air conditioning could be a factor in the control of upper respiratory diseases.

The invasion of the human body by a virus or bacteria is assisted by the lowering of the resistance, brought about by chilling, overheating, and other factors. The factors that are important in the air are temperatures, humidity, air movement, and radiant heat.

It is important to know that the thermal radiation of the body may account for as much as 60% heat loss; other factors are convection, condensation, evaporation, according to the temperature, moisture and movement of the surrounding air.

Air conditioning functions best when the loss is equal to the production of heat, with constant adjustment. An important point is the delivery of good air and the removal of contaminated air.

Comfort, however, is another matter and there are great individual variations. Ordinarily the temperature of 68 to 72° Fahrenheit and not more than 50 feet per minute of air movement is considered an average condition. The differential from the outside air must not exceed 10 to 12° to produce the most comfortable results.

It has been shown that there was a reduction of the pneumonia rate in industry from 12 per 1000 to three per 1000 by preventing hazardous exposures, and such experiences are usually thought significant.

The work of Kerr showed that colds were contracted because of the inability of the body to adjust itself to changing external conditions.

In the Metropolitan experience, comparing a group of 5000 subjected to the best known air-conditioning exposure and a control group of an equal number who did not have such exposure, it was found that there was no difference in the incidence of sickness, absenteeism, and respiratory disease. BRISTOL also showed the same experience in a women's group in the American Telephone and Telegraph Company.

In conclusion, air conditioning is the only way to provide comfortable conditions in crowded quarters and maintain the desired air factors. It is safe to say that air conditioning has begun to overcome bad results of poor ventilation and therefore shares a place among the control measures of respiratory diseases.

DR. LOUIS SCHWARTZ presented the final number on the Thursday morning program, speaking on "Diagnosis, Treatment and Prevention of Industrial Dermatoses."

The reason why industrial dermatoses are important is because of the fact that 60% to 70% of the reported occupational diseases are skin diseases. It should also be remembered that the skin is the first line of defense against external irritants. However, it should also be emphasized that all skin diseases in industrial workers are not due to occupation.

Etiology is most important with reference to treatment, prevention and compensation, both for the worker and the physician.

Because it takes several visits to make a diagnosis in many instances of industrial dermatoses, it is believed that the insurance companies might well pay for these three to four visits for an accurate diagnosis, rather than to expect the physician to yield to the temptation to make a diagnosis of industrial etiology in a great many instances.

Colored lantern slides of skin lesions were used to good effect to illustrate the differences in types caused by occupational influences and also those not caused by occupational influences in the study of differential diagnosis. Among these were paronychia in food and vegetable handlers and housewives; ulcers produced by acids and irritating salts, such as soda, lye, dichromates and chromic acid; acne produced by chlornaphthalene; folliculitis from the handling of coal tar products and petroleum oils; cauliflower-like lesions in coal tar and petroleum workers; precancerous keratoses in oil and tar workers; skin cancers in oil workers; melanosis from coal tar residue exposure; epitheliomata in pitch workers; vesicular eruptions from dehydrators, such as dry lime; dry fissured eczema from urea formaldehyde powder (also caused by sugar or salt); anthrax; and eczematoid lesions from trisodium phosphate and chlornaphthalene.

Occupational dermatoses must develop (1) on the job; (2) within a few days; (3) if allergic, there must be a reasonable period of incubation, usually more than seven days; (4) without previous skin diseases; (5) and get better when off work or get well when off work; (6) on exposed parts, such as the hands or face, or there may be other parts exposed; (7) through friction of parts; (8) when on body, especially the anterior portion, the clothes are soiled; (9) presenting a characteristic morphology; and (10) the patch test must differentiate between a primary skin irritant and a sensitizer.

The patch test should never be used with a primary skin irritant or an unknown chemical, and it should be remembered that patch tests do not represent working conditions. There are many qualifications to be borne in mind with reference to patch tests, and there are greatly complicated relationships existing.

With reference to the differential diagnosis, there must be a careful working out of the etiological diagnosis. The phytons offer the biggest problems in differential diagnosis—only a negative extract reaction is significant.

As to treatment, the irritant must be separated from the man. It is best to try to develop immunity by continued contact. This immunity lasts approximately three months. Mild solutions should be used in eczematous oozing lesions, while in dry lesions the mildest of ointments.

As to prevention, separation is best. One can, however, control the difficulty in various ways—by ventilation, appropriate clothing, changes, cleanliness, and by substitution sometimes, but this latter is largely a dream. The protective ointment should be based on logical grounds and contain no irritant.

A special diagnostic chart was shown on lantern slides; this diagnostic chart should be of great help to industrial physicians in the diagnosis for their industrial skin patients.

Thursday Afternoon: September 11

DR. HARRY B. STONE talked on "Essentials of First Aid and Later Management of Industrial Eye Injuries."

First aid should begin in the employment office where a pre-employment examination should include an eye examination. This involves the provision of visual charts and colors and a well lighted room. The eye should be inspected, vision should be determined both with and without glasses, search should be made for strabismus, the visual fields should be plotted, and color vision should be tested.

Surveys have shown that approximately 55% have normal vision without glasses and that 20% can be brought to normal. Approximately 20% have pathological findings of some kind. Important it is to realize that without visual records, there can be no defense of later claims.

The greater number of injuries involve the conjunctiva, the other structures are less frequently involved. Only a mild antiseptic is used in injuries, such as mercurochrome or merthiolate. The shop oculist should be avoided like poison.

It is the habit of the speaker on referred cases always to test the vision, even when there is a foreign body in the eye. Removal of particles is done with local anesthesia and mercurochrome is administered. The eye is covered after a foreign body removal or when an abrasion is treated. Instructions are given to remove the eye covering the next morning if the eye is comfortable—if not, to report again.

Penetrating wounds necessitate special consideration and treatment. Localization should always be done before a giant magnet is used.

In summary, it is extremely important to make a record of the vision of the injured eye before treatment. Routine bandaging of the abraded eye is recommended. X-ray examination should be done for foreign body. A guarded prognosis should be given relative to eye injuries.

DR. GEORGE H. CROSS spoke on "The Handling of Chemical Burns of the Eye."

Chemical burns of the eye are chiefly acid or alkali burns. It is believed that it is a good rule never to neutralize acid burns, but always to neutralize alkali burns. Alkalies continue a very severe corrosive action and, therefore, need to be neutralized, whereas acid burns can be treated as to first aid procedure rather efficiently by washing with water.

Colored slides of eyes damaged by caustic soda and lime were shown.

Allusion was made to the experiments of Hubbard, which showed that alkali burns were best treated by weak acids rather than water, but if there are no weak acid solutions available, it is really best to get running water immediately.

An experience in artificial silk manufacturing showed that irritation was due to fine droplets of sulphuric acid in the spinning room air. The process is now protected properly.

The speaker believed in using glyceride of tannin for eye burns, in spite of British reports to the contrary.

In closing, the speaker cited a case of splashing lead in the eye of a high school student; in this instance, the skin was transplanted to keep the eyes open and to prevent obliteration of the cul-de-sac. This boy was able to return to school and finish his work in the regular time.

DR. RUDOLPH C. THOMASON discussed the subject "Detection and Control of Defective Vision in Industry."

Visual examinations are not intended to sidetrack applicants for industrial employment, but rather to grade and place visual defects and those who have them. There is no hard and fast rule covering all occupations, but Culler, in 1941, devised a tentative schedule of ocular requirements for some different occupations.

A lantern slide showing percentages of visual efficiency

TENTATIVE SCHEDULE OF OCULAR REQUIREMENTS FOR VARIOUS OCCUPATIONS

Class	Ocular Requirements	Suggested Examination	Minimum Requirements of Visual Efficiency
1. Outdoor Laborers	Orientation	Visual acuity	With glasses, 20/100 in one eye and nil in the other, or visual efficiency of 36% (suggested standard)
2. Craftsmen, mechanics, carpenters, workers on assembly line but not workers on rapidly moving tool	Moderately good vision for intermediate distance	Visual acuity for distant and near objects	20/50 in one eye with glasses and nil in other, 56% visual efficiency (suggested standard)
3. Workers on rapidly moving tools	Moderately good vision depth perception	Visual acuity for distant and near objects; stereopsis tests; muscular balance	20/40 in each eye 83.6% visual efficiency and 50% stereopsis (?)
4. Operators of motor-driven machines, such as crane operators	Good orientation at a distance	Visual acuity distant and near; stereopsis; muscular balance; color vision	20/40 in each eye 50% stereopsis (?); less than 5° horizontal or 3° vertical muscular imbalance, with glasses; (83.6% visual efficiency)
5. Those engaged in discriminating, close work	Good vision and stereopsis; considerable reserve because of constant, close application	Visual acuity, distant and near; stereopsis; muscular balance	20/30 in each eye with glasses; 50% stereopsis; less than 5° horizontal or 3° vertical muscular imbalance with glasses (91.5% visual efficiency)

corresponding to the Snellen test distances was given and explained.

In conclusion, the speaker stated that statistics from an examination of 3000 industrial employees showed that about 3½% had pathological conditions of the eye.

DR. C. N. SCOTT spoke on "Protective Equipment for Eyes in Industry."

Great strides have been made in the production of protective equipment for the eyes. The first development was the safety goggle; in the beginning no attention was given to the lens and the frames were poorly constructed. However, a great deal of improvement has been made since. Colored glass was also used for protection against glare many years ago, but recently there has been considerable development in gradations of colored glass for various kinds of rays.

Lenses are now heat-treated and are made to withstand rigid impact tests. There have been various regulations with reference to scratching and breaking of lenses.

There are also now prescription lenses placed in goggles whereas not long ago this was not done.

A great deal can be learned from workmen's experiences and adapted to the prevention program. It seems best to formulate rules or regulations for a mandatory plan for certain jobs, rather than to rely on voluntary cooperation.

Goggles are better issued from the medical dispensary rather than from a storeroom; this provides an opportunity for better observation and check-up as to fit. In a recent experience goggles were instrumental in reducing an incidence of 72 injuries to 11 injuries per month.

In Virginia, the laws provide that loss of one eye entitles the injured person to 33% disability for 132 weeks.

In closing, the speaker displayed many varieties of goggles and protective equipment.

Thursday Evening: September 11

DR. D. FRANK MILAM spoke on "Newer Advances in the Knowledge of Nutrition."

The object of recent surveys is to find out who is malnourished, a question which is not so easy to settle. It is also important to know how malnutrition occurs. It should be understood in the beginning that there are two kinds of hunger, hollow and hidden. Our real interest is in the latter, especially in the lack of essential food elements, of which there are 35. Of the amino acids, there are 10; of the mineral salts there are 15; of the vitamins there are eight, and there is also water and fat.

A survey was made in a small cotton-mill town in North Carolina, of 400 inhabitants. Four methods were applied —(1) physical examination; (2) medical history; (3) seven-day diet history; and (4) blood examinations for vitamins. It is believed that about 60% of the population was included in this survey. For comparison, the farm population nearby was examined, and examinations were conducted on both groups in the spring and in the fall.

The results showed that adults average 2000 calories a day, which was a deficiency of 1000 calories. However, a comparative group in Duke Hospital showed the same caloric intake. The diet showed a record of 23 milligrams a day (the usual is 50 milligrams per day) of vitamin C. Blood examinations showed that only 13% had a normal level (which is taken to be anything above 0.6 milligrams per 100 cc. of blood). However, in the 225 persons examined, there were only six cases of scurvy found. In the fall, it was found that 16% had a normal level.

In summing up, it was shown that there was a tremendous shortage of vitamin C. Incidentally, scurvy can be prevented by a slice of lemon once a week or a food rich in vitamin C once a day.

There was no vitamin A shortage, there being an average of about 4000 international units per day. There were about 1000 units of intake of riboflavin per day. About 700 micrograms daily of B_1 was ingested, which is about half the normal intake.

It was found that it was not possible to do anything about nicotinic acid intake; pellagra is a real problem in this state.

As to mineral salts, calcium intake was about half the normal, iron intake a little more than half normal.

In concluding, DR. MILAM gave the following advice on adequate diet: One serving of protein element per day; pint of milk for adult and a quart for a child; two servings of vegetables other than potatoes; a raw vegetable, a raw fruit and a whole grain once a day.

DR. EDWARD J. STIEGLITZ completed the evening's program, discussing "Aging as a Problem of Industrial Health."

Aging is an old problem and is taken for granted in most instances, but there has not been much done with the problem. The average age is going up, was 47 at the turn of the century, now is 63. There are now nearly nine million people in the United States aged 65 or over.

The older groups show insidious chronic and endogenous afflictions.

Gerontology includes a study of (1) biology of senescence; (2) clinical problems of aging (both abnormal and normal); and (3) socio-economic problems. These factors, as mentioned, involve both clinical methods and personnel management.

Industrial medicine has two problems with regard to older people—(1) the doing of a periodic health audit (and this means a real health audit); and (2) therapeutic measures, which involve the principle of medical service to correct physical defects.

Preventive geriatrics, however, must be personal and used against long-continued indulgences. Important is the control of such indulgences, rather than complete cure. There is great difficulty in recognizing early degenerative diseases. Then also, it is difficult to change routine or habits. Inertia can be overcome by education, but it will take time. In industry, the application of these principles should start at the top, with key men.

In discussing the problem of physiological versus chronological age, capacities should so be arranged as to be continuous through changes in jobs.

In summary, a brief indication of the problems of preventive geriatrics was given. Research into senescence problems is greatly needed. The obvious results of the defects in the application of proper principles is reflected in the increasing toll of disability in the older groups.

Friday Morning: September 12

DR. JOHN H. FOULGER discussed "Medical Control of Industrial Exposure to Toxic Chemicals."

In our thinking on industrial health programs, there is great need to emphasize the gulf between plans and action. There is a real scarcity of trained personnel. In addition, however, the medical profession has no real realization of the needs of the industrial field.

If the plant physician does his actual job of prevention, he will not need to assume the role of reporting case histories of industrial poisoning. The practice of real industrial medicine is not limited to traumatic surgery. The real basis for prevention of industrial disease from chemical sources is clinical physiology, which is not adequately presented in the medical schools. Neither are the combined resources of all toxicological and pharmacological laboratories in the country adequate to cope with the situation. Generalization on the physical and chemical structure of new compounds is a wild dream. We have to turn to the organism on which the results are expressed for a real assessment.

The general reaction is primarily a stimulation followed by a depression. Any interference with the physiology of the organism sets up a defensive mechanism tending to produce an equilibrium. The initial response is fatigability, headache, gastro-intestinal symptoms, precordial or epigastric pain. These obviously depend upon recognition by the subject, but the intensity cannot be measured. Unfortunately few physicians are trained in the art of cross-examination. And so it happens that most symptoms are valueless. There are, however, a few signs, and the best of these is a change in blood pressure.

In low concentrations, toxic chemicals raise the diastolic blood pressure without affecting the systolic pressure, ultimately however producing a systolic rise. In larger concentrations, the systolic pressure is lowered without affecting the diastolic, or it may also lower the diastolic. Actions are reversible if discovered early enough and

exposure is discontinued. The ultimate risk is greater with a high diastolic pressure.

The preventive program calls for examinations every three weeks, including general items and blood pressure on both arms in a sitting posture. There should be no greater variation than 20 mm. of mercurcy in the systolic pressure and 10 mm. of mercury in the diastolic reading.

The tendency in statistical work is for pressures to arrange themselves according to the so-called normal distribution curve. It was found that the mean reading for the diastolic pressure was 79 and the system used provided that anything below will have a score of less than 1.0.

A monogram was contrived for the scoring of the diastolic and systolic pressures which occurred simultaneously.

By this statistical method, it is possible to rate the effect of ventilation, protective clothing, and other factors. Diastolic pressure is little affected by emotion, although the systolic is. One can also evaluate the effects of emotional factors in the management.

The clinical work was correlated with experimental work on dogs. It is possible also to show the effects of drugs of the sulpha compounds, acetanalid, and others), the effect of alcohol, carbon monoxide, and other factors outside of work.

In conclusion, it is believed that this statistical method is one which will give useful results in the evaluation of the effects of industrial exposures to toxic chemicals.

DR. T. LYLE HAZLETT spoke on "Placement of the Worker."

The last quarter century has showed a great change with respect to methods and procedures in industry, there being greater use of mechanical methods, machines, and equipment, resulting in the worker doing only simple jobs.

Placement is based on the results of physical examinations and upon the hazards incident to the job. There has been great difficulty in convincing management of the justification of the increased cost involved and convincing labor of the benefits of these procedures. Experiences, however, with transfers which have resulted in difficulties, when specific examinations have not been done, show the necessity of using these types of procedures in placement.

A set of job cards, which are particularly useful to the employment and medical departments, was shown on lantern slides. Four types of examinations are done: The routine, one for dusty occupations, one in which there is special blood examination (particularly for exposures to metals and solvents), and finally the special skin examination with reference to external irritants.

The usual A-B-C-D rating has been extended for special jobs.

Emphasis is placed on occupational histories, the proper type of examination form, the different kinds of examinations, as previously noted, the A-B-C-D ratings, a job specification form, and what is known as "Advice of Employment" cards.

In conclusion, this is one of the examples of the responsibility and opportunity of preventive medicine in industry to maintain an American way of living.

DR. H. PAGE MAUCK discussed "Backache."

Backache needs to be divided into two principal groups, occupational and traumatic. The first type (occupational) occurs in those with postural difficulties and in individuals with poor musculature. Systematic corrective exercises are necessary in these instances and proper adjustment to job requirements. Prevention can be readily accomplished by these methods.

With regard to the second group (traumatic) there have been many confusing reports and papers. The majority of these cases are due to sprains and strains. X-ray offers little except as to other pre-existing or concurrent conditions. The history and clinical examination are probably more important.

As to nomenclature, strains should refer to muscles, and sprains should refer to the ligamentous structures. Hyperextension of the back places tension on the anterior ligaments and flexions on the posterior ligaments.

Hypertrophic arthritis is rather common in all persons over 40 years of age; there is a loss of pliability of the ligaments, hence new bone is laid down at the ligamentous attachments.

Prognosis in backache depends upon the patient's condition and his attitude.

Treatment consists mainly of rest and time. Sometimes heat and massage will help, but it should be emphasized that the electric pad is abused. Usually some type of fixation is necessary for from three to six weeks; this is then discarded and passive and active motion begun and accomplished before going back to work.

DR. MURRAY B. FERDERBER completed the Friday morning session in discussing "The Selection of Heat in the Treatment of Plant Injuries."

It is important to realize at the outset that an injury in industry is not different from those which occur outside of industry.

After the U. S. Bureau of Mines' experiments in the early nineteen-twenties, work at Pittsburgh was begun in 1929 using the three forms of heat in the experimental work: Radiant forms, diathermy and moist heat. In 1937, at Pittsburgh, luetics were treated with heat with favorable results. Experimental work was also done on dogs, confirming the clinical results.

Results have shown that infra-red radiation is of little value in increasing blood flow and increasing deep muscle temperature. Short wave applications increase deep muscle temperature and later increase blood flow. Moist heat requires 30 minutes to increase blood flow substantially and the same holds for deep muscle temperatures of 105-107° Fahrenheit.

The Carrier dewpoint machine was used for humidifying the air in these experiments, it being found that two to three hours' treatment is necessary for the procuring of any definite results.

The various forms of heat, have been found useful, in cutting down time loss both from fractures and sprains.

Lantern slides were shown depicting the effects on various subjects, local fever therapy box, and other equipment. Comfortable equipment is especially to be desired and has been emphasized in this work. Subjects show no particular pulse change but do show an average increase of 1500 white blood cells.

In conclusion, it is believed that this type of therapy is useful in rehabilitation of industrial injuries.

Friday Afternoon: September 12

PROF. DONALD E. CUMMINGS discussed "The Evolution of Industrial Health."

There have been great changes in health service programs during the past 25 years. Before that, prevention was largely disregarded. But public opinion was instrumental in causing the changes. There were also the influences brought by the compensation laws.

Both engineering and medical control measures have been put into play. There has been education in safe practices. However, there have been some foolish practices, such as allowing a fracture case to draw pay while sitting in an office, and the practice of medicine by non-medical persons.

It is interesting to note that workmen may in some instances think that safety measures are designed for reducing compensation—this on account of the adoption of management's point of view.

Contract practice in industry introduced many evils, such as making available to management information which should have been confidential. Many industrial hospitals have been started because of the necessity for making prompt treatment rapidly available. Then came the period of fixed salaries for medical men in industry. Consequent upon these industrial developments, there developed an attitude of suppressing information with respect to silicosis cases, because of a feeling of disloyalty to management.

The prevention and control of occupational diseases should be vested in the department of hygiene and paid for by industry. Both physicians and engineers need special training for this work.

It is important to know and, further, to carry out, the principle that both physicians and engineers carrying on in the prevention and control work be closely related and correlated to the general engineering department of the industrial plant.

The physician should have a confidential arrangement with respect to records. The worker should also thoroughly understand that there will be no breach of confidence, except for the protection of the public health or in case of litigation.

In conclusion, it was stated that the most important phase of the industrial hygiene department should be general health supervision, including safety, study of absenteeism, and other important routines.

DR. THOMAS BEATH discussed "Newer Antiseptics." It seems particularly significant that we should know the potentialities of the newer antiseptics for use in wounds.

The speaker was aware of the opinion held among most surgeons with respect to these principles.

Outlines of the ideal antiseptic were given, and it was stated that probably one could not find all of these ideals in one compound.

Especial consideration was given to 1% aqueous iodine, 5% dettol, ½% amphyl, 1 to 500 metaphen, 1 to 3000 furmerane, 1 to 1000 zephiran, 1 to 1000 merthiolate, and 1 to 1000 proflavine.

Experiences have shown that in the various tests made, iodine is not adequate in 1% solution, and that other solutions are highly irritating. The mercurials fall down because of inactivity produced by contact with fluids and tissues; there is injury to tissue in some instances.

Zephiran, which is non-mercurial, appears to be subject to similar disadvantages.

On the other hand, 5% dettol has strong bactericidal power if it is not dissipated in its strength by tissue and fluid contact, and is almost wholly non-toxic to tissue, but is somewhat toxic to leucocytes.

Similar, but with less reserve power than dettol is ½% amphyl.

The acridines, of which proflavine is the best known, are bacteriostatic in weak solutions, reducing the bacteria in a reasonable time. Furthermore, these substances are not materially influenced by blood and fluids.

In summary, one would make a choice of dettol or proflavine sulphate. The limited clinical experience with these compounds up to the present time seems favorable. It should be emphasized that the use of these compounds is not a substitute for proper mechanical methods or cleansing, but may be supplemental. The newer compounds have a comparatively lower cost than the older ones.

DR. HENRY C. MARBLE presented the "Importance of Purposeful Splinting Following Injuries to the Hand."

Cotton mill experience shows that over 80% of injuries are to the hand, wrist and forearm. Simple first aid measures are best:

Pressure to stop hemorrhage, sterile dressing, splint, and transportation to the hospital.

In injury to the median nerve, one should splint slightly in flexion and bring the thumb to the middle of the hand. Splinting material may be of plaster, leather or thermax.

In injuries to the ulnar nerve, one should splint with flexion of the phlanges on the metacarpal, with fingers together and thumb in apposition.

In injuries to the radial nerve, splinting should be done with the wrist in extension and with extension of the proximal phlanges on the metacarpals, the thumb also being in extension.

Simple compression is accomplished by cotton and elastic bandages for wounds where there are no nerves or tendons severed. The wound should be kept elevated for the greatest amount of comfort.

The principles for the correction of wrist drop were outlined as follows.

The roller is placed in the hand with gentle, gradual, elastic traction attached to an outrigger. The same procedure is used for adducted thumbs.

DR. SUMNER L. KOCH completed the program in discussing "Prevention and Treatment of Hand Infections."

One of the most important procedures is to keep contamination away from the wound, especially that type of contamination which comes from the nose and mouth of attendants. It is, therefore, wise to wear a mask from the time of giving first aid to completing surgical care.

The wound is first cleaned with white soap and water. Then it is irrigated with water for a long period, until it is well washed.

In infected wounds, one first makes the diagnosis and then wet dressings are applied. One has to ask himself the questions as to whether the infection is local or spreading, and where it is localized.

For drainage, one cleanses with white soap and water, a bloodless field is accomplished by the use of the blood-pressure cuff, general anesthesia is given, careful incisions are properly placed, and soft drains only are used, followed by wet dressings, using sterile instruments and great care.

Lantern slides were used to good advantage, showing various types of hand injuries, topographical anatomy at different levels, tendon sheath infections, and types of incisions.

In subfascial infections, it is important to make incisions parallel to palmar creases.

The following things are found in tendon sheath infections: Semiflexion, unified swelling, tenderness, and pain on extension.

Industrial Safety and Health

— From an Executive Viewpoint —

JOHN J. PORTER,
President, North American Cement Corporation

THE horizon of a business executive is popularly supposed to be bounded entirely by dollar-and-cent marks. I don't think this is true, and I personally know business executives who object strenuously to even talking about the dollar value of industrial safety and health programs. The humanitarian aspect is the compelling argument and in my own industry in asking for support for our accident prevention bureau, I have always found a much more enthusiastic response to the humanitarian argument than to any financial argument.

However, it takes all sorts of people to make a world and to some the possible financial saving is all important. Moreover, the economic aspect is of general interest and, therefore, I will start off with this subject.

First, as to the cost of accidents. The National Safety Council have estimated that the cost of occupational accidents for 1940 amounted to almost 700 million dollars, divided into wage loss 490 million dollars medical expense 80 million dollars and overhead cost of insurance 110 million dollars. This does not take into consideration the loss due to disruption of production. We have no data as to what it would cost to prevent these accidents and what the net profit might be, but obviously there is a large margin on which to work.

Presented at the Annual Dinner of the ASSOCIATION FOR THE ADVANCEMENT OF INDUSTRIAL MEDICINE AND SURGERY, New York, October 23, 1941.

In the cement industry, accident prevention work is sponsored by our Portland Cement Association through the medium of a committee of manufacturers, supported by a paid staff of skilled safety engineers. This work has been carried on since 1912, but reliable statistical and cost data have been available only since 1920. Taking this as our base year (and bearing in mind that an earlier base year would show a much more striking contrast), the statistics show that during the next 18 years, our accident prevention work resulted in a saving to the industry of something over 12½ million dollars. This total is made up on the assumption that the accident rate prevailing in 1920 would have continued unchanged if it had not been for the safety campaign. On this basis, our work during that period has prevented 955 deaths and permanent total disabilities, 1,400 permanent partial disabilities, and 49,762 temporary disabilities. Figuring on average compensation awards for these classes of accidents, the total direct savings in compensation were approximately $9,500,000, with an estimated saving in medical cost of approximately three million dollars.

The cost of this work conducted by our Association amounted to less than $300,000 for the 18-year period. Making any reasonable estimate of additional costs of individual companies, it would appear that accident prevention work has been a very profitable investment based solely on dollars and cents saving.

As to industrial health work, the National Association of Manufacturers has a Committee on Healthful Working Conditions with your colleague, DR. VICTOR G. HEISER, as consultant. Studies made by this Committee show that America's 17 million industrial workers lose an average of 9½ days each per year as a result of illness and accidents combined. This amounts to about 160 million man days per year. The value of time lost in terms of wages is more than three-quarters of a billion dollars a year and this does not include such other costs incidental to injuries and sickness as compensation, spoilage, employee replacement, etc. A recent Committee survey revealed that industry is steadily expanding plant health programs and developed the following facts:

First, that plant medical programs cost an average of $5.17 per man per year, safety programs $3.34, and industrial health programs $3.41. Where combined costs were reported, the total of these three types of service averaged $8.81.

Second, that these programs have, in an overwhelming majority of cases considered, effected net savings to the companies.

It is estimated that a health program saves the average 500-employee plant $5,611 net per year. In passing, it may interest you to know that this same survey showed that out of 2,300 companies reporting, more than half give physical examinations to all employees and almost as many have plant dispensaries. Three-fifths have group life insurance for the employees, 36% have group health and accident policies, 22% have employee benefit associations to provide sickness and health benefits and more than one-third have group hospitalization provisions.

It would appear, therefore, that industrial health and benefit programs have been pretty well sold to a large proportion of American industry.

IT IS the part of the industrial executive to organize and supervise, and in organizing a safety and health program there are three phases which must be considered; namely, research, organization, and the selling job.

The first thing to be done is, obviously, to determine the nature of the job, and that calls for statistical research. In the case of safety, we must know what accidents are occurring, where they occur, to whom they occur and why they occur. With this data in hand, we can then direct our efforts effectively. In the case of health, we should have records of absenteeism and the causes therefor. If there are occupational hazards, this data will bring out the facts and again enable us to direct our work effectively. Moreover, statistics are essential in order to measure progress, and, as human nature is constituted, it is most difficult to keep up sustained interest unless we have a goal and run a competition with ourselves or others. Those of you who play golf will understand the psychology of this.

In the cement industry, our health program is not as far advanced as safety. We have only in recent years started collecting statistics on absenteeism but we are beginning to get some very interesting and valuable information. In interpreting the data, we are greatly handicapped by the lack of adequate comparative data from other industries, but we hope that with the help of your group and other interested groups this situation will be improved in the near future.

After the danger points have been discovered, it is more than likely that research will be required to determine the best method of eliminating or reducing the dangers. In the case of safety work, there will, in certain cases, be a considerable amount of engineering research required to develop the best type of mechanical safeguards or to discover a safe method of performing some operation. In the case of health, a great deal of practical research is applicable to occupational health, and there is, of course, a great deal more that is urgently needed.

I have already spoken of the N.A.M.'s consultant, DR. HEISER, who has been most active in studying the problems involved in better working conditions and has made many recommendations to member companies on means of improving the health of employees. Particular emphasis has been put on making available to small companies the knowledge and experience developed in larger ones. Every year, the N.A.M. sponsors clinics on health in industry, bringing together medical experts and manufacturers for discussion of employee health and related problems.

THE cement industry has sponsored one piece of medical research of which I am personally rather proud, since it was supervised by the Com-

mittee of which I am chairman. This is on the prevalence and dangers of silicosis in our industry. When, in 1934, it seemed wise to supplement fragmentary data with a comprehensive study of workers' health in our industry, a small group was selected from within our Committee on Accident Prevention to develop a plan, to supervise the study, and to render a report. This subcommittee reviewed past history, made a preliminary survey and investigated medical research organizations. The Saranac Laboratory for the Study of Tuberculosis was finally chosen to direct the research. Eleven cement plants geographically and otherwise representative of the entire industry were selected for medical study and in these and six additional plants complete qualitative and quantitative surveys of the various dusts were made. Of some 35,000 workers ordinarily employed in cement manufacture in this country, this study included a complete survey of the health and working environment of 2,278 men of whom 1,979 were in occupations exposing them to more or less dust. The remaining 299 composed chiefly of clerks, etc., served as a control group to check the findings on those presumably exposed to dust.

DR. LEROY U. GARDNER personally directed the work. The examinations at six of the plants were made by DR. D. M. BRUMFIEL, Saranac clinical consultant, and the others by local practitioners acceptable to DR. GARDNER. Stereoscopic x-rays were taken in most cases and excellent quality film obtained without exception. All of these were read by DR. H. L. SAMPSON at Saranac. Occupational histories were taken by members of the Association staff. Engineering measurements of the dusts were made by Saranac technicians and petrographic analyses were made by L. H. BERKELHAMER, of Saranac, and checked by ESPER S. LARSEN, of Harvard, or DR. ALTON GABRIEL, of the U. S. Bureau of Mines. Each plant study required about three months' time, and results were carefully reviewed by DR. GARDNER and the industry committee in order to insure accuracy and completeness as well as to discover possible improvement in technique.

The results of this survey showed that silicosis is not ordinarily an occupational hazard in the cement industry. In spite of popular opinion, this might be logically expected because of the fact that cement and the raw materials from which it is made are high in lime and for the most part any silica is chemically combined with lime. Out of all employees examined, only eight men showed evidence of silicosis, and of these six had had exposure to silica dust in previous employment; the other two had been exposed to conditions which are not usual in our industry in that they had been operating mills grinding sandstone at particular plants where this material was a necessary addition to the raw material. Needless to say, conditions at these plants have since been corrected so that no workman is now exposed to silica dust. In addition to this information on silicosis, the survey showed that our industry had an unusually low incidence of other chronic respiratory diseases. As compared with a mixed group of industries reported by the U. S. Public Health Service, we have a slightly lower rate for the classification of "other respiratory diseases."

On the other hand, influenza and pneumonia occur among our workers somewhat more frequently than among workers in miscellaneous industries. This is perhaps not surprising since most of our employees work in open buildings or in yards and quarries with relatively little shelter. This above-average weather exposure may account for the excess of these illnesses. We have discovered no logical connection between the pneumonia rate and dust but there is a well established connection between pneumonia and exposure to weather and also between influenza and weather exposure.

Apparently, from experience in my own industry and from what I hear of conditions elsewhere, the greatest single health problem calling for medical research is the problem of influenza and the common cold. To help prevent colds among their employees, many companies are spending considerable time and money searching for the best preventative for their particular needs. Some of them, I understand, give their employees cod liver oil, others try vaccines and many companies wage a campaign through company newspapers and bulletin boards warning against undue fatigue and improper diet. With all this, influenza and colds are, I believe, the greatest single cause for continued employee absenteeism.

COMING to the matter of an organization for health and safety, one way of doing it is to hire a doctor and/or a safety engineer and tell them to "go to it and make our plant a healthy and safe place in which to work." This approach is usually more or less unsuccessful. Safety at least is more than half a matter of attitude of the supervisors and workmen and less than half a matter of mechanical safeguards. I suspect that a similar situation exists with industrial health, and that even after the obvious (to a doctor) occupational health hazards have been pointed out, there will still remain a lot to be done.

Safety is distinctly an operating matter. Even though a safety engineer may discover and may have authority to have installed all necessary mechanical safeguards, it will still be found that the human factor and the instructions and training given by foremen are of vast importance. For example, instructions never to oil moving machinery, instructions that motor switches must be locked open before work is done on machinery driven by them. We need specialists, yes, but these specialists must act in cooperation with and give their instructions through foremen in order to get results.

I HAVE spoken of the selling job as it affects the attitude of workmen. This is the most difficult phase of safety work and will probably prove to be equally important in industrial health. We find that a large part of the job of our safety

engineers is selling the idea of safety, and this may be equally true with plant doctors.

A recent experience at one of our plants will illustrate the point. We had, a few weeks ago, a fatal accident—the first lost-time accident of any sort at our four plants during the present calendar year. In this case, a workman attempted to put belt dressing on the head pulley of a conveyor while it was in motion. To do this, he removed a guard, reached in, was caught by the belt and killed. We have a rule at this plant that no work of any sort must be done on moving equipment without first shutting it down. Just a week previous, the same workman had been cautioned by his foreman against doing the very thing which resulted in his death. Probably he had taken this and other chances many times before in order to save a little trouble but this time he didn't get away with it.

I went to this plant shortly after the accident and sat down with our superintendent and safety committee and found on discussing the matter an attitude of defeatism. They had done a good job of safeguarding, but there was a lot of complaint that some of the men would not cooperate, that since the advent of the union we did not have the discipline we should have, etc. I listened to them and finally said, "Now, boys, you have got a wrong attitude on this. You have done a good job on safeguards, but you have got to realize that it is just as much your job to sell safety to the workmen as it is to install mechanical safeguards. Now let's see what we can think up that will do a better selling job." We then talked over our program of safety meetings, personal instructions, etc., and were able to find a number of things which could be improved and some new ideas on which to work.

Closely related to the factor of workmen's cooperation is the matter of executive interest. In spite of the fact that the employee is the direct beneficiary of safety campaigns, it is futile to expect him to take much interest in it unless the leadership is assumed by the management. In the old days, before accident prevention received any consideration by management and the workmen were responsible for their own safety, they made a pretty poor job of it, and even today, after all the work that has been done, it is surprising how soon our men slip back into habits of carelessness and chance-taking unless there is a constant effort made by industrial executives to keep them interested and enthusiastic.

Moreover, our supervisors in the plants need a good deal more than general approval of a safety program. Obviously, the plant executive is going to give his chief attention to costs, output or quality in accordance with the emphasis placed on these factors by his boss in their conferences. If the subject of safety is ignored, it will be the exceptional operating man who will give it the attention it deserves. The chief executive, therefore, must not fail to bring up regularly the subject of safety and to emphasize its equal importance with other operating objectives.

IN THESE days when government bureaus are reaching out for more and more authority, it may be well to say a few words on the role of government in safety and health work.

The first steps in government efforts in this direction were taken in the early days of my connection with industry and were legislative in their nature, consisting of the passage of various state compensation acts, and, to my mind, this was a reform which was badly needed and which has accomplished great good. I can recall the time when the injured man or the family of the deceased had no recourse except a suit for damages. Most of us carried liability insurance at that time, so these suits were against insurance companies and it was their business either to fight or to compromise on the best possible basis. In many cases, the injured parties were shamefully imposed upon by slick and unscrupulous adjusters. To me and to most other industrialists who had the welfare of their workmen at heart, it was a great relief to have compensation for various types of injuries fixed definitely by legislative enactment.

More recent developments have not been as satisfactory. The setting up of state labor departments, who send inspectors into our plants to tell us where the danger points are and what we must do about them, is of doubtful value. Many of these inspectors are sincere, hard-working individuals, but there are also some who are politically appointed, incompetent, and must justify their jobs by making reports requiring impractical and useless expenditures. In the very nature of things, they must ignore the chief cause of accidents, the attitude of the workmen.

Moreover, industry has good reason to suspect that some of these governmental safety bureaus are or will become political tools. I know of one case where legislation requiring government inspection with power to enforce findings has been sponsored by a powerful union with the expectation that, if passed, they would control the inspection service and use it to punish non-union employers. To my mind, the proper role of the government in safety and health work should be to impose heavy penalties for accidents or occupational illnesses. These penalties should accrue to the benefit of the injured or sick persons and should be of sufficient magnitude to make it financially desirable to the employer to do a good job of prevention. The means for accomplishing the desired end can then be safely left in the hands of the management, which in the great majority of cases is far more competent to organize and direct safety and health programs than any government bureau can possibly be.

It is a sad reflection on any company which will not voluntarily take reasonable steps for the welfare of its employees without regard for government pressure or financial gain, and I do not want to leave with you any impression that there are many industrial enterprises falling in this class. On the contrary, the vast majority of them are fully alive to their responsibilities and are voluntarily doing a fine job. In the cement in-

dustry, our accident frequency in 1920 was 43.8 injuries per 100 million man hours. In 1940 it had dropped to 4.90. Up until 1924 no plant in the industry had gone through a calendar year without a lost-time accident, and when the first plant did this in that year, it was considered an outstanding achievement. In 1940, however, there were 47 plants which won the Association trophy for this accomplishment.

From a circular issued by the U. S. Bureau of Mines, I note that there are many other mineral industries doing equally well. The 1940 National Safety Competition conducted by this Bureau resulted in fewer accidents in proportion to number of man hours worked than in any other year in the records of the contest. Some of the outstanding records include a bituminous coal mine in Wyoming which operated 360,955 man hours with only one disabling injury that caused 39 days of lost time. A copper mine in Arizona operated 192,024 man hours without a single lost-time accident. A limestone operation of an Alabama steel company had 248,412 man hours without a disabling injury. Out of 143 enrollments for the quarry group, 73 quarries, including, I am happy to say, three of my company's plants, operated through the year without a lost-time accident.

IN concluding I want to say a few words about the philosophy of this movement in which we are so much interested. Fundamentally it is an attempt to increase the sum total of human happiness, and I would remind you that happiness is the ultimate objective of all human endeavor, whether this be business, political, social or whatnot. In safety and health work we are trying to prevent things which destroy happiness.

I do not need to remind you of the unusual dangers and difficulties of this present time. While so much emphasis is being placed on the production of implements for the destruction of human life, and while the headlines of our papers are full of stories of the death and injury of multitudes of human beings, it is difficult to arouse enthusiasm over measures designed to save a comparatively small number of individuals from the consequences of accident or illness, and thus our task of securing attention and arousing interest is definitely more difficult.

A few weeks ago I attended the opening game of the World Series. I am not a baseball fan and perhaps I should be ashamed to say that up to a few days before this game I did not even know who the contenders were to be. I enjoyed the game, but the chief thing that aroused my interest was the enormous enthusiasm displayed by the crowd of 70,000 people. It was really inspiring, and I could not help but think how much could be accomplished for any good cause that could succeed in arousing popular enthusiasm to the same extent. The power is there if constructive leadership can find the way to use it, and I have felt that sometime when leaders in industry and science realize the possibilities and seriously tackle this problem, they will find ways to harness this power for the good of mankind.

The Company Doctor

—*His Opportunity*—

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THE opportunities for the medical man in industrial work today, who does not care to enter the military service, or who is unfitted therefor, I believe are greater than at any previous time, owing to the shortage of talent, which is becoming more acute.

If he is a young man the field of industrial medicine and surgery offers exceptional advantages; notably, the prestige, the opportunity to perfect himself in physical diagnosis, internal medicine, minor and major surgery, and in the field of public health and safety; that is, the betterment of working conditions, and the prevention of occupational diseases as well as accidents.

I believe a tour of inspection at regular intervals by the medical man with the officer in charge of each plant,—the shops, officers, and wherever men are working indoors, followed by a brief report with suggestions for corrections and betterments, would be of value.

In other words the industrial medical man of today must be not only an all around doctor, but something of a sanitary engineer as well. He must be one who has personality enough to get along with all classes and types of men, and at the same time be able to hold their respect.

For the young man entering the industrial field in a city this will be comparatively easy and pleasant, for he will probably have the opportunity of serving under an older and more experienced doctor, and his advance will be gradual or rapid according to his merits. But if he is located in some out of the way place, without the benefit of consultation or hospital service, the experience may not be so pleasant; at least at first. It will not only try his patience and professional skill, but also his courage to carry on in the face of many difficulties and disappointments, and criticisms, just and unjust.

I recall my first location, as a mine surgeon in the jungles of Central America 27 years ago, after completing my internship in a large modern hospital. The first question asked by the consulting engineer was, "Did I feel capable of performing a Cesarian operation without benefit of hospital, assistance, or nursing care?" When I was honest enough to say "No," I got the job. The next location was not much better than the jungle so far as facilities were concerned. It was on a railroad, high in the Rocky Mountains, with the thermometer at 40 below for days and nights at a time. There was either a loose wooden "hotel" or shacks to care for the sick and injured, but here one had the consolation of knowing the hospital was only 12 to 36 hours away, depending on the efficiency of the rotary snow plow and the tender heart of the master mechanic. Such apprenticeships are

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hard, but they make one appreciate the modern hospital and equipment when it is available. They also make one resourceful in the face of difficulties.

For the man in the 40-plus bracket who is moving in where the younger man entering the military service leaves off, many of these hardships will be avoided, because he will undoubtedly locate in a large town or city. He has the skill, experience, and poise gained in general practice, but he will also have missed a lot of fun.

TO SUMMARIZE the opportunities for the man of either type, they will be about as follows:

First: The prestige of being connected with a large industrial concern or railroad, and the association with other medical men in the field with whom he is working, as well as his company officers. Also, his hospital connections. He should seek an appointment on the staff of his hospital for the benefit of his corporation, and likewise, so that he may demand the very best possible care for his patients. In some institutions handling corporation work, there is a tendency on the part of supervisors and attendants to regard these patients in a matter-of-fact manner and as secondary to private cases, feeling that they have to come there anyway, and private cases must be given preference. The corporation patient is quick to sense any inattention, and, while he may not complain at the time, his friends and fellow employees soon are aware of the neglect, and the corporation, the institution, and the doctor are criticized; perhaps justly so.

Second: The advantages presented for study of the many problems confronting the industrial physician and surgeon not ordinarily seen in general practice. Industrial medicine and surgery is a continuous post-graduate course which keeps its practitioner on his toes, and in a city his opportunities for betterment are practically unlimited.

Every day the railroads are more conscious of the fact that the man who is healthy physically and mentally is an asset and not a liability. He is a better workman in the job where he is placed, and is more likely to climb the ladder. Here the initial physical examination is of special importance, and I believe this could be made more valuable by bringing in the x-ray and other laboratory tests, particularly where there is doubt concerning chest and spinal conditions. To evaluate the importance of old injuries and also to fortify the company against unjust claims and suits, I believe the medical examiner should be given more leeway in sizing up the mental fitness of the aplicant as well as his adaptability to fit himself into his job.

Third: The facilities and equipment furnished the industrial surgeon in the way of supplies, hospital, x-ray, medicines, physiotherapy, and nursing care, not to mention the wonderful training in bookkeeping he gets in trying to keep up his reports—all these things are most gratifying. I believe the average industrial patient today has the advantage over the average private patient, both for efficient treatment and his opportunity for getting well. Practically nothing is denied him, whether he is an official or one who has worked but a few days on the section.

Fourth: Soon after he has established himself, the company doctor's contacts are of a most pleasant nature, both with officials and the men. Aside from his professional contacts, he will form friendships, both in the rank and file, which will last through the years. He will meet all types, the "boomer," the "bomb-thrower," and many fine characters in modest occupations. These contacts will eventually lead to an increase in his private practice. If he has the reputation of being a good "company doctor," surely he will have no difficulty in building and holding private practice.

Fifth: The compensation may not be princely in a financial way, but it is steady and sure, and will continue as long as his services are desired. But I believe the other features mentioned will outweigh what he might feel is lacking in monetary consideration. Also the features of insurance and retirement now given to railway surgeons are a comforting thought for the future if one finds himself financially low in his declining years after a lifetime of hard work and sacrifice.

His dealings, both with the employee and the company should be carried on in the same manner as if the patient's family doctor were present.

These qualifications demand much of the doctor in industry. Only by measuring up to high standards, not alone of medical skill and scientific ability, but also a high ethical concept of the duties to the injured workman and his fellow practitioners in medicine, can he meet with success in industrial practice.

Faith Healing

—As "Medical Care" under the Workmen's Compensation Act—

I. H. RUBENSTEIN,
of the Chicago Bar

IN the past century, numerous faith healing sects have been "discovered and founded" in the United States. These sects, for most part, are quite similar in that their "theology" stresses faith healing to the exclusion of practically everything else, particularly medical care. At the present time, the largest and most representative of these faith healing sects is the Christian Science church. Its lone tenet, similar to that of other faith healing sects, is that all human ailments, injuries and diseases are non-existent false beliefs which can be "cured" by prayer and faith, and that medical and surgical care is unnecessary. As there are about 10,000 Christian Science practitioners and nurses and also hundreds of other various species of faith healers in the United States, it would appear that there are at least a million persons in this country who are members of faith healing sects.

The question thus may often arise as to what the law is in those workmen's compensation cases

which involve an injured "employee," who is a member of a faith healing sect, and who as a result refuses medical care, as to his legal rights under the workmen's compensation act. The only reported workmen's compensation case on this point, in which a member of a faith healing sect was involved, is the case of *Ash* v. *Barker*. In that case, the facts were as follows: The claimant, a Christian Scientist, was a middle-aged woman who managed an apartment house. In the course of her employment, she fell from a chair, severely injuring herself. From the date of the accident until 40 days later, when she quit her employment on account of the unbearableness of her suffering, she relied solely upon Christian Science treatments given by a practitioner to cure her injury. Shortly afterwards, she submitted to surgical operation. The evidence showed that she should have taken the operation immediately after the accident. In holding that she was *not* entitled to workmen's compensation, the Industrial Commission declared that Christian Science treatments are not such as "may be reasonably required to cure and relieve where surgical treatment is indicated by the symptoms. In delaying such surgical treatment for more than two months, applicant (claimant) not only jeopardized her own interests, but also the interest of her employer, and in fact slept upon her rights to demand medical and surgical treatment at the expense of her employer or her employer's insurance carrier."[1]

In accord with this ruling that faith healing treatment cannot be substituted for medical care in workmen's compensation cases, all the authorities[2] on workmen's compensation law are agreed that workmen's compensation benefits are not to be paid for the disability or death of an "employee" where the same is caused, continued or aggravated by an unreasonable refusal to submit to medical or surgical treatment.

On this particular phase of workmen's compensation law from the faith healing standpoint, the State of Wisconsin has a unusual provision in its Workmen's Compensation Statute.[3] This statutory provision states that the "employer shall supply . . . at the option of the employee Christian Science treatment in lieu of medical treatment"[4] provided that the employer may elect *not* to be subject to the preceding section by "filing a written notice of such election with the Commission."[5] This particular statutory provision is undoubtedly meaningless. As can readily be seen the latter section of this provision completely nullifies the first section. By the express terms of the latter section the employer (or his insurance carrier) has the sole and exclusive right to decide as to whether the employee is to receive medical care or Christian Science treatment. All that the employer has to do in order to bar the employee from Christian Science treatment is to file a written notice of his election not to be subject to the first section.

In other words, this statutory provision actually gives an employee no right whatsover to Christian Science treatment unless the employer neglects or fails to file his written notice of election. From a practical standpoint no employer (insurance carrier) would allow his or its employee(s) to take Christian Science treatment, rather than medical care, because such Christian Science treatment would be certain to result in an aggavated and perhaps ruinous workmen's compensation claim which probably would either jeopardize or prove very costly to the employer's business. There can be also no doubt whatsoever that this Wisconsin workmen's compensation statutory provision—as a matter of interest—is clearly unconstitutional in that it is discriminatory in favor of "treatments" given by Christian Scientists as against the "treatments" given by members of other faith healing sects, and also because it denies to the "treatments" given by members of other faith healing sects the equal recognition and protection of the laws.

1. 2 Cal. Ind. Ac. C. 577. (1915).
2. Workmen's Compensation Law, Schneider, Vol. 2, p. 1644; Honnold's Workmen's Compensation Law (2nd Ed.), Vol. 1, Sec. 137; Angerstein's Employer & Workmen's Compensation Act of Ill., Sec. 456, p. 744; Corpus Juris, Vol. 71, p. 639, ¶394.
3. Wisconsin Statutes, 1939 Supplements.
4. Supra, No. 102.42 (1).
5. Supra, No. 102.42 (5).

A Syphilis Control Program for Industry

—And Its Integration with the Community Program—

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QUALITY production at maximum efficiency and minimum cost is one of the guiding principles by means of which American industry has attained supremacy among the nations of the world, and the directors of our industries have always been alert to remove any obstacle to the operation of this principle. For a long time our larger industrial organizations have realized that their attainments were in direct proportion to the health of their personnel, and more and more of them, during recent years, aware of the economic losses produced by uncontrolled syphilis, have fully recognized this disease as a definite and tangible hindrance to their effective operation.

Not only does industry suffer efficiency losses in the plant from syphilitic casualties but it also sacrifices to the spirochaete each year an indeterminable percentage of its profits. No inconsiderable fraction of this is represented by taxes and community charities, and in this way industry contributes substantially to the enormous yearly cost of syphilis in the United States.[1]

The management of many of the industries in this country recognize the humanitarian as well as the economic significance of uncontrolled syphilis. They have learned, as a result of the far-

reaching educational campaign of the U. S. Public Health Service, that concerted control measures can make syphilis a rare, if not an extinct, disease. Many of them have formulated in their respective organizations, programs for the discovery and treatment of this insidious and costly disease. The success of these existing programs, and of the programs to be adopted, will depend largely upon a clear recognition of the two fundamental relationships involved—the relation between employer and employee and the relation between industry and the community. Most industrial control programs have adequately considered the employer-to-employee relationship; few have concerned themselves with the relationship of such programs to the community of which they form an integral part. And yet the second relation as well as the first must be successfully developed if an enduring and effective program for the control of syphilis is to be carried on in industry.

Establishment of Proper Relationship

NO LAW or policy can be successfully administered in a strictly democratic state without the consent of the majority to be governed thereby. Any new policy adopted by the executive branch of a concern with regard to employees must be completely understood and accepted by the group to which it applies. In the formulation of an industrial syphilis control program, the most important consideration is a complete understanding and agreement upon all phases of the fundamental policy by the representatives of both the employer and the employees. This frequently can be attained through conferences with the local union officials and the employer. It would seem advisable that the policy-making group for such a program should consist of competent representatives of both the employer and the employees together with experienced consultants from the local, state, or Federal public health agencies. With reference to the preservation of amicable relationships within the industrial organization itself as well as the successful conduct of the program, this group would undoubtedly find its task would involve two main subjects: the creation of the value and need for such a program in the minds of the employees through a well planned educational program, and the development of specific policies regarding the operation of the program. The latter would be concerned chiefly with such questions as the voluntary or compulsory nature of the participation by the employee; the extent of confidential relationships; the effect on first employment, continued employment, demotion, and promotion; the content of the examination; and the requirements relative to treatment.

EDUCATIONAL CAMPAIGN PRECEDING ONSET OF PROGRAM.

The introduction of a new policy in an industrial organization will produce the best results if the employees are in sympathy with its purpose and method of operation. In order properly to prepare a group for the willing acceptance of a syphilis control program, the group must be carefully educated as to the need for and the means of bringing the disease under control. Such information need not be in the form of detailed scientific reports, but should be in the form of brief, scientifically accurate facts stated in simple language. It should not be presented as an appeal to the emotion of fear but rather to the emotion of hope, thus building up in the men confidence that the syphilitic when found can be helped and probably cured. This should be followed by the presentation of information that syphilis can be prevented and perhaps completely eradicated, dependent upon the amount of cooperation given by those concerned. Simultaneously the educational program should explain the role that each can play in the battle to conquer and control syphilis. As the above two educational thoughts reach their maximum comprehension, the natural reaction will be: "What can I, or we, do to help to control and eventually eradicate syphilis?" When this point is reached, it is the proper time to introduce the syphilis control program fostered by the industrial organization.

It is, of course, to be realized that practically every plan of approach will vary according to the educational and social level of the men concerned, the nature of the industrial organization, and the characteristics of previous and present community educational programs. The facilities available for educational purposes may be broadly classified into the written, the graphic, and the spoken types of presentation. Educational literature would include items in the company's bulletin in the form of health news, pamphlets of information written in popular style for general distribution, and special articles placed on the various bulletin boards. The graphic type of presentation would be of the nature of posters, simple exhibits, and possibly motion pictures, depicting vividly but simply some of the more important facts concerning syphilis control. Talks given by properly informed medical and public health men before company meetings, union meetings, and community organizations to which many of the employees belong would do much towards stimulating active interest.

As stated before, the educational campaign outlined here is to prepare the employees for a willing acceptance of an industrial syphilis control program. Such a campaign should not stop with the establishment of the syphilis control program but should be carried on continuously and concurrently with the operation of the program. The educational campaign during the operation of the control program should acquaint the employee specifically with the nature of the disease and its proper treatment, with methods of prevention including simplified prophylaxis, and with any other information which might enable him to avoid acquiring or spreading the disease.

POLICY AS TO COMPULSORY OR VOLUNTARY PARTICIPATION.

One of the first questions that will arise in the minds of many employees will be whether or not they will be forced to participate in the program

in order to retain their positions. The element of compulsion in a democratic state is always looked upon with suspicion, and a program operated by force is usually doomed to failure. If the educational campaign has been well conducted, voluntary participation will undoubtedly reach the vast majority of the employees. An excellent method of beginning the program would be for the company and union officials of the plant to set an example by having their own examinations initiate the program. As Moore suggests: "If industry is to be consistent in this matter, it will begin the performance of routine serologic tests for syphilis with the President of the company, the Board of Directors, and the Medical Director..."[2]

All employees who have had recent examinations by recognized physicians and approved serological laboratories should be allowed to present the proper evidence in lieu of a repeat examination.

Rather than place too much emphasis upon force or compulsion, the program policy should establish routine serologic testing with all regular examinations—such as examinations for employment, and those following return from an extended illness—already contained in the plant policy.

MAINTENANCE OF CONFIDENTIAL RELATIONSHIPS.

Lest any doubt arise concerning the confidential nature of the examination, it should be definitely stated that no one except the necessary medical staff shall have access to the information so obtained. The only exception to this will be where community or state laws require reporting of diagnosed cases. The method of conformance to the laws by the medical staff with reference to cases found should be clearly stated. It should be specifically stated that no one else, including fellow workers, foremen, superintendent, company or union officials, shall be informed of the results of any examination. Information concerning any individual will be given out only upon the written request of that individual. Such requests must be signed by the individual himself, and properly witnessed.

POLICY REGARDING CONTINUED EMPLOYMENT.

A quite natural question to arise is: "If I have syphilis, how will it affect my job?" This must be answered clearly and explicitly so that fears concerning continued employment will not occur. It should be specifically stated that no employee will be discharged or refused employment, as a result of an examination disclosing syphilis. The policy as expressed by Newquist is as follows: "Old employees who are found to have syphilis are usually permitted to work in their usual or in selected positions provided they are receiving adequate treatment."[3]

Employees, who are food handlers, or work with materials which are used for foods, or whose work causes them to come into close contact with their fellow workers or other persons need no special consideration except when open infectious syphilitic lesions are present on the skin or mucous membranes. Such individuals having physical contact with other persons or articles used immediately after contact, in, or on the body of other persons should be temporarily removed from such positions until all open infectious lesions have been completely healed. Competent medical opinion, however, should have the deciding voice in determining whether an individual has open infectious lesions of syphilis.

Refusal or lack of cooperation in obtaining adequate treatment should render the individual subject to repeated medical examination. Such individuals, if found to be either potentially infectious or a possible menace to safety, should be required to take regular medical care, as a prerequisite to continued employment.

Competent specialized medical consultants may find in individual cases that men with serious syphilitic lesions as advanced cardiovascular or central nervous system syphilis, may be a safety menace to themselves or to others in their present positions. These individuals should be transferred to less hazardous positions if this procedure is at all possible.[4] Where conditions render this impossible, it will be necessary to lay off or reject them for their own welfare and for the general public welfare. They will form only a small fraction of those found to have syphilis.

Individuals discovered to have syphilis through the routine pre-employment examinations should not be rejected merely on the basis of having syphilis. The same policy should apply to them as to present employees.

To discharge employees or to refuse employment on the basis of syphilis alone is an injustice to both the individual and to the community. This practice, however, is not uncommon in some industries and such individuals are frequently thereby relegated to the relief rolls merely on the basis of a single doubtful or positive serological test. The adoption of such a procedure is without scientific medical foundation, and, therefore is to be strongly condemned.

EXAMINATION AND DIAGNOSIS.

Adequate examination, as in any other type of medical or health examination, should consist of three essential parts: the history, the physical examination and laboratory tests. To base the diagnosis of syphilis entirely upon any one of these procedures is an injustice to the individual and a serious reflection upon the competency of the medical staff. Admittedly, histories alone are frequently evasive or of little aid; physical examinations, disappointing in their disclosures; and serologic tests occasionally non-specific in their reactions. However, in as much as modern industrial organizations have at least pre-employment and in many, regular periodic examinations, the program for the discovery and control of syphilis in the plant many logically commence with a serological survey of all present employees. The complete examination will be reserved for individuals presenting doubtful or positive serological results. The complete examination for syphilis should then be incorporated into the pre-employment, periodic, and routine "return-from-illness" exam-

inations. In other words, the medical staff should at all times be consciously looking for syphilis in all individuals examined by them.

Examination is merely the means of obtaining an impression or a conclusion—the diagnosis. Only in so far as the examination is intelligently done will the diagnosis be accurately made. A diagnosis of syphilis without classification into its stage of activity is insufficient in modern medical practice. The disease must be classified as to its stage, and as to what, if any, demonstrable lesions are present. In a small percentage, the establishment of the presence of syphilis or the determination of the stage of the disease may present a very difficult task for a busy medical staff. Patients belonging to this group may require special examinations, procedures, such as neurological and cardiological consultations, electro-cardiograph studies, and cerebrospinal fluid examinations, in order to accurately establish the diagnosis. This type of service should be available to the medical staff in aiding it to decide upon the disposition of the patient with regard to both treatment and safety of continued employment.

Regardless of the stress placed upon history and physical examination, there is an ever increasing tendency on the part of many physicians to place almost total reliance upon the serological test for the diagnosis of syphilis. This tendency is an actuality, therefore, it must be respected; hence great care must be exercised in choosing a reliable test and an accurate laboratory. Standard tests of proven value and standards for laboratory approval have been compiled by the U. S. Public Health Service[5] and should serve as a useful guide. It has been said that serologic tests are only as dependable as the laboratory which performs them. Annual examination including a serological test for syphilis would be an excellent minimum standard to adopt.

TREATMENT.

The individual classification of each case of syphilis into its proper stage of clinical activity or inactivity forms the most important single factor by which therapeutic procedures can be intelligently outlined. By this means, one can usually group the cases into three general therapeutic categories: patients, who may be treated by the standard treatment procedure for early syphilis as outlined by the Cooperative Clinical Group;[6] those requiring special treatment; and a small group in which the best therapy is no treatment. The first group would include all uncomplicated cases of not more than four years duration—the most important from the standpoint of control because they constitute the potentially infectious cases. The second group may be subdivided into three divisions as follows: the early cases with non-syphilitic complications which would render the standard treatment of the Cooperative Clinical Group dangerous; latent cases of more than four years duration—these could be treated by some modification of Dr. J. Earle Moore's[6] suggested outline of treatment for late latent syphilis; and finally, cases having syphilitic complications, such as cardiovascular or central nervous system syphilis, which would require special therapeutic skill and therefore should be handled only by experts. The last group would comprise only a very small percentage of the total, and would usually consist of elderly individuals whose onset of the disease was many years previous and whose only symptom or sign was a positive blood test.

Although many attempts have been made to formulate rigid standards of treatment for each of the various stages of syphilis, no hard or fast rules can be adhered to because of the variability from individual to individual of the human constitution. This variability must be recognized and considered both in outlining therapeutic procedure, as well as in the determination of criteria for "cure,"—the point at which maximum benefit from treatment has occurred. Hence, the most practical rule to follow would be to advise continuous medical care according to modern standards for the treatment of syphilis with such modifications as may be necessary in individual cases, until treatment is no longer indicated. The ultimate success of therapy, however, will depend upon both the skill of the physician actually administering the treatment and the regular cooperation of the patient.

Inasmuch as syphilis cannot be defined as an industrial disease, the policy with regard to the administration of treatment must be clearly stated.

This policy would vary according to whether the industrial medical service assumes the responsibility for the supervision and administration of treatment of infected employees or requires the discovered infected individuals to procure their own medical attention independent of the industrial medical staff. Although industry may be able to furnish excellent care, it is definitely in keeping with medical ethics to refer all patients "promptly to their own physicians."[3] Treatment of employees for syphilis by industry should be resorted to only when adequate treatment cannot be obtained otherwise. However, such objections as Gehrman advances—that the advice to infected employees to seek their own physicians has resulted in many instances of mistreatment—could readily be avoided if proper preliminary steps are taken. Two steps would be necessary: first, the education of each patient, prior to reference for treatment, as to the nature of his disease, the measures necessary to prevent its spread, the type of treatment he should reasonably expect, and the approximate duration of treatment; secondly, the provision of a list which the patient could consult of physicians qualified to treat syphilis and willing to cooperate with the medical staff. Finally, there should be a written agreement between the industrial medical staff and the patient, in order that the staff may follow the progress and treatment of each individual case.

With such a scheme in operation industry may feel that it has thus completed its essential duties in the formulation of its policy affecting the employer-employee relationship.

Integration of Control Programs

AS of July 1, 1936, the U. S. Department of Commerce estimated the total population of the United States as 129,257,000; 50,000,000 persons over 10 years of age to be gainfully occupied; 24,257,924 of the gainfully employed to be entitled to medical service for industrial injuries under the compensation laws.[8] This represents a minimum of 19% of the total population who are employed in industry. It would be a conservative assumption to consider that on the average each gainfully employed person has at least one dependent; hence, 38%, or approximately two-fifths, of our entire population depend directly upon industry for their livelihood. It would not be unreasonable, in consequence, to assume that any industrial health program if widely adopted would affect at least 38% of the population directly or indirectly. This percentage, of course, would vary considerably from community to community. At the present time, with the great industrial expansion for defense purposes, the percentage of the population employed in industry will probably increase considerably beyond the estimated 19%. In addition it should be recalled that the industrial workman spends only approximately one-third of his time in the industrial establishment; two-thirds of his time is spent in regular community life.

No further evidence need be presented to establish the fact that industrial organizations comprise an integral part of community life.

NEED FOR COORDINATION OF INDUSTRIAL AND COMMUNITY PROGRAMS.

Inasmuch as industry is an integral part of the community it is reasonable to conclude that the success of its syphilis control program will be directly related to and dependent on the intelligent handling of the problem in the community. Likewise, the success of the community syphilis control program will be directly related to and dependent on the intelligent handling of the problem in industry. "The prevalence and incidence of syphilis in any industrial group will naturally equal that of the surrounding community."[8] For example, a program designed only to discover and treat existing syphilis which did not include attention to finding and rendering non-infectious the sources of infection and the contacts of infected persons is like building one's home upon a foundation of quicksand—the result quickly disappears and soon the disease reappears among the previously negative group. It would be just as logical to suppose that a negative examination for syphilis conferred a lifelong immunity. Hence, the successful industrial program, to be effective, must be properly coordinated with the community's control program because only the official community agency—the health department—has the legal right of enforcing follow-up procedures relative to suspected cases, sources, and contacts. This legal authority also applies to case-holding procedures in infectious cases. Industry can use discharge procedures—and then frequently to its embarrassment—to bear upon infectious employees refusing treatment, but discharge of such individuals only removes them even further from the influence of control procedures. The community's health department, however, has the authority invested in it by the state legislature to place the recalcitrant infectious patient under chemical or physical quarantine until non-infectious, if educational measures fail.

Sayers has ably summarized the foregoing as follows: "The responsibility of finding the source of infection and eliminating it before the disease is spread to others is largely a job for the public health authorities, and the industrial medical officer should expect and receive vigorous cooperation in such case finding. Where the industrial medical officer does not receive this kind of cooperation, he should state his case clearly to his own management, to his medical organization, and to associations of business men who are coming increasingly to an understanding of this problem. With these as allies, he should be able to secure action.

He will find, in most cases where the health official has not cooperated, that it is a lack of administrative authority under the law or lack of funds that has made it impossible to cooperate effectively.

Health officials will, I am sure, welcome such allies in educating legislators and the public to the problems of syphilis control."[9]

COMMUNITY REGULATIONS AND THEIR APPLICATION TO AN INDUSTRIAL CONTROL PROGRAM.

Every state in the United States has declared syphilis to be a communicable disease dangerous to the public health and has given its respective departments the responsibility of the administration of laws designed at controlling and reducing the incidence of communicable diseases. The majority of states, in addition to the usual communicable disease laws, have specific legal measures applicable to syphilis. In many of the larger cities of the country, ordinances, more comprehensive than the state statutes, have been enacted for the purpose of controlling syphilis. Basically, however, the majority of state and city laws pertaining to syphilis control incorporate the following four provisions:

1. Reporting of diagnosed cases, contacts of infectious cases, lapses in treatment of infectious cases, and terminations of treatment;
2. Adequate treatment for infectious cases;
3. Services for follow-up of contacts and delinquent treatment cases; and
4. Power to quarantine.[10]

The reporting of diagnosed cases of syphilis to the health department is the principal provision or responsibility that the industrial medical staff must carry out, regardless of whether or not the patients are treated by the plant physician. This responsibility may, in some places, be lightened or facilitated by cooperation with the physician treating the patient and sending to the health department a combined report of the case. It is self-evident that assisting the health department in keeping infectious patients under treatment and

in tracing their contacts will materially help in the successful control of syphilis. The provisions concerning the rendering of infectious cases non-infectious by adequate treatment apply strictly to the physician treating the case. The provisions concerning follow-up, case holding, and quarantine rest within the jurisdiction of the health department. In order for the health department to carry on sound epidemiologic and other control measures in a community it must have the cooperation of all medical agencies in the reporting of cases, of contacts, of treatment lapses, of infectious cases, and of treatment terminations. Until coordinated effort on the part of industry and the community's health organization towards syphilis is established, the costs of an industrial control program will probably pay very unsatisfactory dividends.

Summary

THE active participation by industry in syphilis control work involves certain responsibilities to the employee as an individual, as an integral part of the industrial organization, and as a member of the community.

As an individual and a part of the industrial organization, the employee's active voluntary cooperation can best be solicited and obtained by guaranteeing the security of his position in industry and in society through sound medical and administrative policies and through maintenance of strictly confidential physician-to-patient relationships.

As a member of the community the industrial worker cannot be expected to rise suddenly above the health standards of his environment and to maintain this high level. An industrial program for syphilis control should, therefore, be actively integrated in and coordinated with the community's syphilis control program.

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Infections and Lesions

—In Minor Surgery; An Advancement in Iodine Therapy—

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THE history of antiseptics is one of vogues—one substance being used temporarily only to be replaced by another. When, in the middle of the 19th century, Lister began to correlate sepsis with bacterial infection, he introduced phenol solutions for antiseptic purposes. Koch later on condemned phenol and hailed mercuric chloride as unequalled in its germicidal power. At the end of the century a great formalin period started, which disappeared completely about 1909. Finally, the iodine period was inaugurated—lasting until today, in many variations.

Although the element iodine was not discovered until 1812 by the French pharmacist, Bernard Courtois, Hippocrates, the Father of Medicine, advised the use of certain iodine-containing seasponges for the treatment of wounds. Two preparations, which had their origin in the first half of the 19th century, the tincture of iodine and Lugol's solution (using potassium iodide to dissolve iodine) are still official in the U.S.P. At the beginning of the 20th century, an ever increasing number of surgeons referred to iodine as a powerful germicide.

Research work of the last few decades has yielded data which show evidence of the inherent value of iodine as a skin disinfectant. The germicidal action of iodine is not limited to vegetative bacilli, but it destroys, also, *spore-bearing* organisms and is, therefore, important in the case of pathogenic spores like B. tetani, Welchii, and anthracis. In 1937, Nye[1] published the results of a comprehensive study concerning the relative bactericidal performance of practically all types of antiseptics, summarizing that iodine apparently possesses more of the desirable prerequisites "than any of the other antiseptic solutions that were tested," and that iodine was the only antiseptic that remained potent, when natural conditions were simulated by testing them in the presence of 50% organic matter (horse serum). Nevertheless, all authorities agree that iodine, though pre-eminent as a skin disinfectant, is by no means entirely satisfactory. In 1918, it was stated by Bonny and Browning[2] that every trace of iodine would disappear from the skin long before an operation was finished. Because of the volatility and corrosiveness of elementary iodine it was impossible to use iodine tinctures, or solutions in wet dressings, or to bandage their applications. For this same reason it has, so far, also been impossible to prepare wound powders and stable ointments containing *active* iodine, as well as iodine-impregnated bandages, tampons, cotton and applicators. Numerous substitutes for iodine have been suggested, with the intention of eliminating the untoward effects without diminishing the germicidal efficiency. Mixtures of iodine and oil have also proved a disappointment. As a gen-

eral experience it was found that non-irritating iodine preparations were also non-germicidal under conditions present in wounds.

Lately a new iodine compound was discovered by Goedrich[3] and introduced to the medical profession. He found that a combination of choleates with elementary iodine forms a new chemical compound, iodocholeate, which gives stable solutions in water-alcohol vehicles, or stable ointments, as well as surgical dusting or wound powders. The

SURGICAL CASES TREATED AT THE NEWARK CITY DISPENSARY

	Patient	Date Admitted	Diagnosis	Iodocholeate Medication	Date Dismissed	Number of Treatments	Results Remarks
1.	N.B.L., 44 Female Colored	1-7-41	Chronic trophic ulcer of left leg.	Solution 35% alcohol and ointment.	2-11-41	5	Ulcer healed. Referred to metabolism clinic for weight reduction.
2.	V.T., 34 Female Colored	2-4-41	Infected left fifth toe.	Solution 35% alcohol and powder.	2-18-41	3	Lesion healed. Patient receiving anti-luetic treatment.
3.	M.K., 72 Male White	2-11-41	Lacerated wound of scalp.	Solution 35% alcohol and ointment.	3-25-41	7	Wound healed.
4.	M.K., 62 Female White	4-8-41	Foreign body (wood) in left forearm.	Solution 35% alcohol and powder and ointment.	5-3-41	6	Wound healed.
5.	W.J., 32 Male Colored	3-4-41	Chronic infected ulcer of right leg.	Impregnated gauze. Impregnated applicators. Solution 35% alcohol and ointment.	5-6-41	10	Healed. Discharged.
6.	G.J., 64 Male Colored	6-3-41	Infected laceration of right middle finger.	Solution 35% alcohol and ointment capsules.	6-10-41	2	Healed. Discharged for regular duties.
7.	J.M., 37 Female White	2-11-41	Punctured wound (dog bite) of left leg.	Solution 95% alcohol.	3-4-41	4	Discharged with no complications.
8.	S.M., 42 Female White	2-4-41	Bilateral axillary abscesses.	Solution 35% alcohol. Ointment. Impregnated gauze. Impregnated applicators and powder.	5-13-41	15	All wounds healed completely.
9.	M.M., 53 Female White	3-4-41	Traumatic lacerations of right hand.	Impregnated gauze. Impregnated applicators. Solution 35% alcohol and ointment.	5-6-41	10	Lacerations healed.
10.	C.M., 25 Male Colored	1-21-41	Bilateral axillary abscesses.	Solution 95% alcohol. Impregnated applicators. Ointment and powder.	4-8-41	12	Healed. Discharged.
11.	S.M., 41 Male White	5-13-41	Lacerations of left buttock.	Impregnated gauze. Impregnated applicators. Solution 35% alcohol and ointment.	6-17-41	6	Healed. Discharged.
12.	A.W., 33 Male White	6-10-41	Infection of right ear.	Solution 35% alcohol and ointment capsules.	7-8-41	5	"Hearing" perfect now.
13.	R.Z., 58 Female White	2-18-41	Left hand infection.	Solution 35% alcohol. Impregnated gauze. Impregnated applicators. Ointment and powder.	5-20-41	14	Patient returned to diabetic clinic for diabetic treatment.
14.	D.W., 34 Female Colored	5-27-41	Infection of right elbow.	Impregnated gauze, solution 35% alcohol and ointment capsules.	6-17-41	4	States she can use right arm normally.
15.	J.S., 26 Male Colored	4-29-41	Postoperative wounds of left forearm.	Solution 35% alcohol. Ointment and powder.	5-20-41	4	Discharged with wound healed.
16.	P.S., 10 Female White	3-11-41	Laceration of right knee.	Solution 95% alcohol. Ointment and powder.	4-8-41	5	Right knee area healed.
17.	J.T., 59 Male White	2-18-41	Severe burns of right arm.	Impregnated gauze, solution 35% alcohol. Ointment and powder.	4-22-41	10	Healed. Very small scar visible locally.
18.	A.T., 9 Male White	7-1-41	Infection of right hand.	Solution 35% alcohol and ointment.	7-15-41	3	Healed. This child very tolerant toward treatment with Iodocholeate.
19.	F.T., 75 Female Colored	1-28-41	Arteriosclerotic ulcer of left leg.	Impregnated gauze, solution 35% alcohol. Ointment and powder.	4-22-41	13	Ulcer healed. To continue with varicose vein injections.
20.	S.T., 38 Male White	3-25-41	Abscess of neck.	Solution 35% alcohol. Impregnated applicators and ointment.	5-20-41	9	Wound healed.
21.	W.T., 20 Male Colored	5-6-41	Lacerations of face and back.	Impregnated applicators, solution 35% alcohol. Ointment and powder.	6-24-41	8	No scarring of face or back visible after healing.
22.	T.T., 8 Male White	6-3-41	Infection of left arm.	Solution 95% alcohol. Ointment and powder.	7-22-41	8	Granulating tissue formation and healed rapidly.
23.	E.P., 45 Male Colored	7-8-41	Foreign body (steel) in right hand.	Powder and ointment.	7-22-41	3	Healed successfully.
24.	C.R., 31 Female Colored	5-20-41	Severe burn of right ankle.	Solution 35% alcohol. Ointment and powder.	6-3-41	3	Healed. No scarring or loss of function of right ankle.
25.	E.J., 49 Male Colored	3-18-41	Abscess of left hip (following bismuth antiluetic injections).	Impregnated gauze. Impregnated applicators, solution 35% alcohol. Ointment and powder.	6-3-41	12	Incision of abscess with postoperative iodocholeate dressings used for healing.

solutions were found to possess higher germ-killing and spore-killing properties than iodine solutions or tinctures of the same strength. The iodine in iodocholeate was found to be only slowly released from its adsorption to the choleates and, also, to be less volatile and, therefore, to be rendering a more prolonged bactericidal action. Lever,[4] of the Skin Clinics of the Massachusetts General Hospital, found iodocholeate to be a highly effective fungicide. He also demonstrated that applications of this new iodine compound may be covered with bandages without causing necrosis. Because of this latter property Scherzer and Goedrich[5] experimented with the iodocholeate-impregnation of gauze bandages, pads, tampons, cotton and applicators. They demonstrated that iodocholeate does not impair the fabric of these materials, as regular iodine solutions would. They also found that these impregnated materials are highly germicidal wound dressings.

The choice of a suitable antiseptic is very important in a metropolitan surgical ambulatory clinic, such as that at the Newark City Dispensary. With an annual attendance of 10,000 patients, a limited surgical staff and limited time for conducting the clinic, the economic phase of rehabilitation of patients is distinctly a vital factor. Our Newark City Dispensary is a typical metropolitan institution, where one meets a multitude of different nationalities. Newark also seems to be a stop-over for many transients, and we encounter a great diversity of minor surgical cases, as later reported.

Since the writer entered this clinic, in 1927, we have used a great variety of antiseptics as they appeared. To mention only a few: Tincture of iodine, 2% mercurochrome, 5% methylene blue and gentian violet in 50% alcohol, phenol, bichloride of mercury, potassium permanganate, and many others. Each of these proved suitable in certain cases, but each was found wanting in one or more respects. Hypersensitivity of the patient to the drug used, local irritation, insufficient germicidal and sporicidal performance, or some other untoward effect always occurred to mar the results sought in a perfect antiseptic.

Principal prerequisites for efficient antiseptics are: High germ-killing and spore-killing action—preferably prolonged, absence of skin irritation or constitutional reaction, and no retardation of the healing process. I have always preferred iodine as an antiseptic. Even to this day I feel safest using it in surgical procedures. But I am aware of its many shortcomings, especially its necrotising effect, because of which its applications cannot be covered with bandages.

About three years ago I decided to start experiments with the previously-mentioned iodocholeate, which seemed to approximate most closely a perfect antiseptic, as I sought it, since it was claimed to have all the germ-killing power of tincture of iodine, but none of its well-known drawbacks. With the consent and cooperation of Dr. Charles V. Craster, the director of our clinics, I used iodocholeate in the following forms in the surgical clinics at the Newark City Dispensary:

1. Solution, 35% alcoholic.
2. Solution, 95% alcoholic (for faster drying).
3. Wound powder, containing iodocholeate.
4. Gauze pads, impregnated with iodocholeate.
5. Swabs, impregnated with iodocholeate.
6. Ointment of iodocholeate (a stable form).
7. Ointment capsules, containing iodocholeate ointment.

I used these preparations on 500 consecutive cases enumerated herein, as their use was indicated. The records of these cases include the patient's name, color, sex, age and past history, and, as the case would necessitate, the size of the lesion, degree of infection, duration and previous treatment, if any. Progress notes describe subsequent measurements of the lesions, change in appearance of wounds and general response of the patient to treatment. In closely observing these cases and their response to iodocholeate treatments, I was surprised to note how rapidly secondary infections cleared up and how soon clean, healthy-looking granulation tissue appeared, resulting in unusually quick healing of lesions and wounds, and, therefore, effecting a more rapid dismissal of the patient from the clinic.

The following Table, taken at random from the clinic records, will demonstrate the course of our routine treatments:

CLASSIFICATION AND NUMBER OF CASES TREATED

1. Post-traumatic lacerations and infections	305
2. Fracture of limbs	25
3. Chronic and acute infected leg ulcers	52
4. Postoperative wounds	25
5. Infected, draining sinuses, secondary to osteomyelitis or tuberculous infections of bone	12
6. Abscesses of the skin in various parts of the body	32
7. Wound Infections caused by "foreign bodies"	10
8. Fistulae in ano and rectal fissures	3
9. Second degree burns	20
10. Cysts of scalp or face	13
11. Bartholin cysts in the female	3
Total number of cases	500

The results of the treatment above cited revealed the following data: 95% totally cleared up; 4.75% greatly improved; 0.25% partly failed to improve on account of the neglect to report for regular treatment, or because they were advanced forms of constitutional diseases, such as tuberculosis or diabetes. Many of these cases had been previously unsuccessfully treated with the usual routine antiseptics.

It may be of some interest to cite, more in detail, typical cases treated with iodocholeate preparations:

One was a colored male, about 63, with a tuberculous osteomyelitis of the left tibia, confirmed by laboratory, clinical, x-ray and surgical procedures. He had previously been operated for this condition on three different occasions. Superficial to this tuberculous osteomyelitis was a chronic secondary infected ulcer, measuring 3 in. x 9 in. x 0.5 in., with two draining tuberculous sinuses in the ulcer area. The patient had been coming to

our clinic for the past 10 years, receiving very little satisfaction or relief from the usual routine dressings. For the past three years his left leg condition has been treated with iodocholeate solution and ointment. At the present time, in spite of the persistent tuberculous osteomyelitis underneath, the superficial ulcer is clean, painless, and shows definite clinical evidence of healing outside of the areas of the draining tuberculous sinuses. The patient is so pleased and comfortable that he will not submit to any further surgical treatments for his osteomyelitis. It may be inferred from the preceding that the patient is clinically improved, although we do know that tuberculous osteomyelitis is practically incurable, and the leg, in a younger person, would require amputation. The patient is now working every day and earning his own livelihood, while previously he depended on charity.

I should conclude from the preceding that the marked clinical improvement was primarily due to the elimination of the secondary invading organisms, usually found in symbiosis with the tuberculous bacilli. This was most certainly accomplished in this case.

The other case was that of a white, obese male, 60, with a traumatic injury of the skull of about four months' duration. At the first examination I noted a large infected sloughing and gangrenous area of the left scalp. The lesion measured 4 in. x 3.5 in. x 0.25 in., and was extremely odoriferous and painful. A large amount of greenish-yellow pus covered the area. First, as much of the gangrenous and sloughing mass as possible was removed. This consisted of several loose hanging portions of tissues. After cleansing the area with a saturated solution of boric acid, wet dressings of iodocholeate solution were applied. After seven days of this treatment, ointment of iodocholeate was then applied daily for three weeks. At the end of four weeks' local treatment the lesion was half its original size; the secondary infection had been eliminated; the lesion was painless, and the patient was anxious to return to work. It was our opinion at the patient's first visit to the clinic that hospitalization with prolonged treatment might be necessary, and yet we proceeded with the local use of iodocholeate, merely as an experiment. X-ray examination of this patient's skull, incidentally, revealed a linear fracture underneath the above-described sloughing and gangrenous lesion. At this writing, the patient has completely recovered and has returned to his usual duties completely rehabilitated.

Treatment

VARIOUS lesions and infections required various forms of iodocholeate for best clinical results. The solution (35% alcoholic) was used principally in moderately severe, secondarily infected open wounds. Impregnated gauze pads and swabs were used in emergency lesions that required immediate attention. Painting with the solution of iodocholeate (95% alcoholic) was resorted to in the healing of wounds, preliminary to using the ointment in some cases. In the majority of such wounds, improvement was obtained with the use of the ointment, and finally complete healing with the wound powder of iodocholeate. The iodocholeate wound powder was generally applied to small, almost healed wounds, especially of the limbs. Alternating treatment (solution and ointment) were used in large secondarily infected wounds. During intervals of visits to the clinic, patients applied ointment iodocholeate once daily to the affected wounds. One application daily was sufficient to effect favorable clinical results.

Conclusions

THE various forms of iodocholeate may be used for a diversity of surgical infections. The solution may be used as a wet dressing or under bandage, in contrast to tinctures of iodine. These preparations were also found not to retard healing, which resulted in rapid rehabilitation of patients. There is no necrosis or constitutional reaction, as may occur with tincture of iodine; iodine allergies could not be observed. Iodocholeate treatments of very large denuded infected surfaces did not cause "iodism" or other untoward effects. Clinically we observed the prolonged action of iodocholeate, due to the lessened volatility, in comparison with iodine. Iodocholeate succeeded, where other antiseptics had failed to improve infected lesions. The impregnated gauze pads, swabs, and the various other forms of iodocholeate should prove to be of definite value in any emergency in which *effectiveness of first aid combined with expedience* is paramount.

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Acute Poisoning from Aniline Oil

—Report of an Unusual Case—

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ACCORDING to McNally,[1] commercial aniline oil is a mixture of aniline (amidobenzol), toluidine, nitrobenzene and other benzene derivatives. It is a heavy, yellow-brown, oily, inflammable liquid with a peculiar pungent odor and a burning aromatic taste. Commercial aniline oil boils at 184°C (363°F), and is sparingly soluble in water but readily soluble in alcohol, chloroform, and ether. It is used extensively in manufacturing processes and is often encountered as an active ingredient of shoe dyes, hair dyes, insoluble

marking ink, lithograph ink, mimeograph ink, and floor polishes. With the rare exceptions of deliberate or accidental ingestion by mouth, most cases of acute poisoning from aniline oil result from direct absorption of the oil through the unbroken skin.[2, 3] While this point is not definitely proved, it is likely that the symptoms of acute intoxication resulting from contact with commercial aniline oil are due to the absorption of the aniline and nitrobenzene contained in this product.[3]

The symptomatology of acute aniline oil poisoning is truly dramatic. Jirouch[3] states that (in severe cases) "there is a dark blue, swarthy cyanosis of the skin, a slow bounding pulse, with booming heart sounds on auscultation, symptoms of air hunger, and sometimes nausea and vomiting." Dultsin[4] called attention to the uniformly low blood pressures in his series of cases and believed that this sign was due to a paralytic effect on the vasomotor system. In the most severe cases there is sudden and extreme prostration,[3] with "cold, pale skin, blue lips, nose and ears."[3] Respiration is markedly depressed, the pulse is weak, there is complete loss of sensibility, the blood pressure is subnormal, and death may occur as a result of a comatose condition.[3] Severe convulsions may occur but are not uniformly present. Dultsin[4] estimates the "toxic" dose of aniline oil at 25 grams, but since the majority of cases of acute intoxication occur as a result of the absorption of the oil through the skin (and no formula exists for measuring the index of absorption) the toxic dose is purely speculative as far as quantity is concerned and must vary greatly with different individuals. The use of alcohol tends to facilitate the absorption of aniline oil from the skin, and Jirouch[3] believes that such users should be barred from industrial contacts with aniline oil as much as possible.

Aside from contacts arising from employment in the dye industry, most cases of acute aniline oil poisoning occur as a result of accidental contact with shoe dyes,[5, 6, 7, 8, 9, 10, 11, 12] marking ink,[12] or the ingestion of contaminated liquor.[13] Majants[14] observed five cases of acute aniline oil poisoning in workmen engaged in unloading a tank of aniline oil. Due to a defective spigot, the hands of these five workmen were covered with aniline oil for a period of several hours and their clothing was saturated with the oil for the same period of time. The authors have recently observed a case of acute aniline oil poisoning resulting from an unusual type of contact and it is believed that it will be of value to present this case.

Report of a Case

A J. M., age 19, white, male, Private, Company D, 126th Field Artillery, was admitted to the Station Hospital, Camp Livingston, Louisiana, at 10:15 A.M. on Sunday, June 29, 1941. He was seen in the admitting office by the senior author (CAPT. GEORGE R. BENTON, JR., M.C.) as an acute emergency and at first glance the soldier appeared to be dead. The pupils were widely dilated, breathing had ceased, and the patient displayed an intense, slate blue, generalized cyanosis. A thready, irregular pulse could be felt, however, and during the hasty preliminary examination, the patient made a couple of gasping attempts at respiration. He was transferred immediately to Ward 3 and emergency oxygen therapy was instituted by means of a nasal catheter. At this time the respiratory rate was not more than four or five a minute, the patient was deeply unconscious and extremely cyanotic. The pulse was 110 per minute and of fairly good volume. The blood pressure was 100/70. The reflexes were generally exaggerated. No history was immediately available but the patient was clad in pajamas and it was evident that he had been in bed before entering the hospital. While he was being placed in bed in the hospital, it was noted that his hands, feet, lower legs and buttocks were liberally smeared and stained with a coal black dye of some character. This dye could not be removed by soap and water but some of it was removed by rubbing with gauze soaked in alcohol. Although the diagnosis was not definitely, established, it was evident that the patient had a very severe anoxemia so treatment was instituted for this condition. The foot of the bed was elevated, atropine sulphate, 1/50 grain, was given hypodermically, the oxygen by nasal catheter was continued, the stomach was lavaged, and 500 cc. of 5% glucose in N.S. solution was administered intravenously. Venous blood was drawn for a blood alcohol determination (blood alcohol 0.5 mgms. cc.) and it was noted that this blood was of "a dark black, chocolate color." The gastric washings were essentially negative and there was no evidence that any of the dye had been taken by mouth. Under this program of treatment, the respiratory rate became more rapid, the periods of apnea ceased and the patient became conscious in about an hour.

The junior author was called in consultation during the first hour of treatment and, on the basis of previous industrial experience, suggested the possibility of acute aniline oil poisoning in the case. Tent-mates of the patient were interviewed, and they stated that on the night of June 28, 1941, the patient had been downtown in the city of Alexandria, Louisiana, and had had four or five bottles of beer during the evening. He returned to his quarters about 10:00 P.M. and immediately went to bed. He made no disturbance during the night and his tent-mates did not know that anything was wrong with him until about 9:30 A.M. on June 29, 1941, when they noted his unconscious state, his stertorous breathing and his extreme cyanosis. The condition of the patient was immediately reported and he was rushed to the hospital. One of the tent-mates produced a partly empty, one-pint bottle of "National Marking Ink—Black," which he had removed from the patient's bed. This had evidently been placed in the bed by some practical joker, as no one could tell where it had come from. Inquiry from the manufacturer elicited the reply that the ink in question contained "aniline oil, denatured alcohol and nigrosine dye."

Within three hours following hospitalization, the clinical condition of the patient was much improved. An oxygen tent became available and the

patient was placed in the tent in an oxygen concentration of 50% (with 5% CO_2). Improvement thereafter was rapid. Six hours after admission to the hospital at least 75% of the cyanosis had disappeared. At that time the respiratory rate was 18 per minute, the pulse rate 84 per minute (full and regular) and the blood pressure 120/80. Facilities were not available for a spectroscopic examination of the blood so the degree of methemoglobinemia present could not be accurately determined in the case. Preparations were made for blood transfusion but the rapid improvement of the patient rendered this unnecessary. The first urine voided after the patient became conscious was of a very dark brown color, but the urine rapidly cleared and was apparently normal in 24 hours. One hour after admission to the hospital a complete blood count gave findings of R.B.C. 4,400,000; W.B.C. 15,050; H. 80% (Tallquist); polys. 62; lymphs. 32; monos. 4; basophiles, 2. No abnormalities were noted in the individual cells. The patient was kept in the oxygen tent for three days and at the end of that time was apparently clinically well. On 7-11-41, the R.B.C. was 4,830,000; the W.B.C. 8,850, with a differential count of polys. 66; lymphs. 29; monos. 3, and eosinophiles, 2. The hemoglobin was 80% on the Tallquist scale, and both the red and white cells appeared to be entirely normal. The patient was discharged to duty as recovered on 7-12-41.

Discussion

THE clinical pathological changes produced by an acute aniline oil intoxication can be divided for purposes of discussion into three main subdivisions:

1. The excessive formation of methemoglobin with a resulting cyanosis and anoxemia.
2. The effects of the anoxemia and of the aniline and the nitrobenzene in the aniline oil upon the central nervous system.
3. The hemolytic effect of the nitrobenzene upon the cells of the circulating blood.

The relatively immediate and dramatic effect of the absorption of aniline and nitrobenzene into the human body consists in the rapid formation of large quantities of methemoglobin and a corresponding reduction of the hemoglobin available for oxygen transportation. This change is manifested by an intense cyanosis with dark, chocolate-colored blood of an increased viscosity and the clinical symptoms of severe anoxemia. Dultsin[4] states that "some authors are of the opinion that the cyanosis in aniline intoxication is a specific symptom depending on the deposition of a specific pigment in the subcutaneous tissue." The rapid disappearance of the cyanosis under appropriate treatment is, however, a strong argument against this theory. Dyspnea is a common symptom in the early stages of acute aniline oil intoxication[1,14] and is undoubtedly due to the great reduction in the amount of hemoglobin available for oxygen transportation.

It is probable that the severe anoxemia present in cases of acute aniline oil intoxication is the direct causative factor in the genesis of the convulsive attacks frequently observed in these cases. Gerard[15] has called attention to the occurrence of severe convulsive attacks in cases of severe anoxemia of the central nervous system. The prompt cessation of the convulsive attacks when the anoxemia is corrected, gives strong support to this view. The unconsciousness, the thready pulse, the fall of blood pressure, the apnea and the final death from respiratory paralysis[1] in these cases are also, in all probability, anoxemic manifestations, but the fact must not be overlooked that both aniline and nitrobenzene are soluble in the circulating blood[4] and in such a soluble condition could directly affect the tissues of the central nervous system. Both of these substances are also lipoid soluble and, because of this physical characteristic, undoubtedly have a peculiar affinity for the cells of the central nervous system. The clinical symptomatology present in severe cases of acute aniline oil intoxication suggests that the effect of these substances upon the cells of the central nervous system may be similar to that of the general anesthetics (particularly ether and chloroform).

As already noted, the formation of a large amount of methemoglobin in the circulating blood is the immediate result of an acute aniline oil intoxication.[4] The blood is "chocolate colored, thick and viscid."[1] The prompt improvement resulting from adequate treatment and the rapid disappearance of the cyanosis in adequately treated cases, suggests that the methemoglobin formation in these cases is an easily reversible reaction and that the great majority of the red blood cells are not affected to the point of subsequent hemolysis. It is well recognized, however, that both aniline and nitrobenzene have a directly hemolytic effect upon the red blood cells and that the amount of subsequent hemolysis to expect in any individual case will depend upon the amount of aniline oil absorbed and the length of time that a toxic concentration is present in the circulating blood.[4] In cases of acute aniline oil intoxication a high indirect bilirubin value pointing to a decomposition of the red blood cells is a constant finding.[4] Signs of hemolysis are evident in the urine in the form of urobilin in considerable quantities.[1,4] Dultsin[4] believes that the nitrobenzene contained in the aniline oil is the potent hemolytic factor and that the aniline is relatively innocuous. An early leucocytosis is a constant factor,[1,4] and a lowering of the minimal resistance point of the erythrocytes is also an early finding.[4] As hemolysis becomes evident, signs of blood regeneration in the form of a marked reticulocytosis appear.[3,4] A thrombocytopenia is usually in evidence.[4] In isolated cases of acute aniline oil intoxication complete recovery is the rule,[1,3,5,11,13,14] but Haldimann[16] and Aiello[17] have both called attention to cases of chronic blood dyscrasia following exposure to aniline oil and aniline dyes.

Jirouch[3] has emphasized the fact that, with intelligent treatment, death is relatively rare in the acute case and that, if coma does not develop in the first hour "the prognosis may almost always be considered favorable." At postmortem the find-

ings are not particularly characteristic.[1] The characteristic odor of aniline oil is evident in all of the internal organs and methemoglobin is found in the blood in large quantities. Hemorrhages into the gastric mucosa, pulmonary edema and degenerative lesions in the cells of the liver, kidneys and heart have also been described.[1] Jirouch[3] is of the opinion that relatively little renal damage is produced by an acute aniline oil poisoning even though "methemoglobin, hemoglobin, bile pigments and unconverted aniline" are excreted by the kidneys in such cases.

Since death in cases of acute aniline oil poisoning is the immediate result of the acute anoxemia present in such cases, it is evident that the prompt administration of a high concentration of oxygen is immediately indicated. Majants[14] advocates bleeding and transfusion together with the administration of oxygen in these cases, and such a program appears to be therapeutically sound. Steele and Spink[13] have reported two miraculously prompt recoveries following the intravenous administration of solutions of methylene blue and suggest that the methylene blue "may combine directly with the poison to form a non-toxic compound which is excreted" or "the poison may combine with hemoglobin to form methemoglobin but the dye acting as a catalytic agent may accelerate the reversal of this process." Jirouch,[3] however, states flatly that "methylene blue, intravenously, is contra-indicated" as "there is no rationale for its use in cyanosis" since it produces methemoglobin in the circulating blood. If aniline poisoning is suspected from a dye, the offending material can be removed from the skin by sponging with a 5% solution of acetic acid followed by a lukewarm shower bath.[3] Intravenous fluids (particularly 10% glucose solution in normal saline) favor the elimination of the aniline and nitrobenzene from the blood stream, and supportive treatment of this type is definitely indicated. Jirouch[3] states that the belief is widespread in the dye industry that the calcium of milk is of therapeutic value in these cases but it has been his experience that milk may produce nausea and vomiting "to add to the discomfort of the patient" if administered in too liberal quantities. It is his practice to use calcium lactate instead of milk, and he philosophically observed that, if it is of no value, it is at least of no harm to the patient. A dosage of from 5 to 10 grains every two to three hours is recommended. Patients reacting from an acute aniline oil poisoning should be kept in bed and closely observed until all objective and subjective symptoms have entirely disappeared.

Summary

AN unusual case of acute aniline oil poisoning in a soldier has been presented.

The symptomatology, pathological physiology, organic pathological findings and treatment in cases of acute aniline oil poisoning have been reviewed.

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Post-Graduate Course

A NUMBER of short courses dealing with the separate phases of industrial medicine and surgery have been given throughout the country. It is indeed gratifying to note Columbia University is now offering a well-rounded-out program on industrial medicine and surgery to be given at De Lamar Institute of Public Health, February 2-14, 1942.

The National Defense Committee has clearly set forth the necessity for maintaining a high degree of health among industrial workers. Plant surgeons, and more particularly those in the smaller plants, are not only concerned with the medical aspects of their work but are also confronted with surgical problems. It is no easy matter to arrange a curriculum suited to their various requirements. Particularly is this true in view of the fact that most of them cannot absent themselves from their organization for more than two weeks. The importance of first aid, rather than the more intricate surgical procedures, has been given proper emphasis.

We are pleased to find among the lecturers those who have done so much to promote our AMERICAN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS—such widely known authorities as DR. MCIVER WOODY and DR. CASSIUS WATSON. A visit to the Medical Department of the Consolidated Edison Company now under the direction of the Association's President-Elect, DR. JOHN J. WITTMER, should prove highly beneficial.

Industrial medicine is fast becoming recognized as a specialized field of endeavor. We have long dreamed of the day when our leading universities would come to realize the ever increasing importance of industrial medicine and surgery and even hoped that this subject might receive departmental consideration. Now that Columbia has taken a step in this direction, it is deserving of the wholehearted support not only of the members of the American Association, but also of all who, not yet long identified with industrial medicine, are in it or are interested in it.

Medical Preparedness

ASIDE from World War I, what experience has the average practicing physician had in the treatment of gunshot wounds, amputations, use of the Thomas splint, or management of gas poisoning. Severe (surgical) shock, extensive burns and osteomyelitis still present unsolved problems. Would it not seem, then, that in addition to technical training a short concentrated course dealing with the fundamental principles of military surgery, and their practical application, might save many lives or prevent total disabilities.

It is a tremendous task to convert a civilian physician into a soldier. The necessity for technical training may be shown in a few examples.

Picture yourself receiving a typewritten order at 2 P.M.: "I shall attack city Y at 5 P.M. Be prepared to receive patients at 10 A.M. Signed, General X."

Imagine yourself at a country crossroads at daybreak. Two or three hundred soldiers are scattered about the terrain. All you are told is: "There they are, Doctor. Go ahead."

Place yourself, with 50 other physicians, in a small town. You have been ordered to develop a smoothly functioning 1000-bed hospital in a period of three weeks. In addition to running the institution, you own it, as it were, being accountable and responsible for government property.

In view of the necessity for technical training, there are those who feel that an M.D. degree is a sufficient professional qualification. However, no matter how much one may know about medical tactics and administration, in the final analysis we will be adjudged on our efficiency as doctors.

It is true that civilian physicians have ample opportunities to better their equipment for military surgery. They may attend clinics, medical society meetings, utilize the libraries, and follow current literature. Yet, one need only visit an active surgical clinic in a metropolitan hospital to realize that hand infections are often badly treated, or fractures improperly reduced or poorly immobilized. Unless professional training is

given, would not the same bad results occur in military service?

Although the Army organization has made provision for "teams of specialists" and, within the larger commands, for consulting specialists, nevertheless, judging from the present conflict, there are no clearly defined battle lines and any of us may be called upon to do almost anything in the event of an emergency.

Would it not be well, then, for all physicians, and especially those in the field of industrial medicine and surgery, to sit down quietly and ask themselves "How could I best serve my country?" We have the assurance of the Surgeon-General that, "in so far as it is humanly possible," physicians will be assigned to duties for which they are best qualified. Therefore, there should be no hesitancy upon the part of the membership of our AMERICAN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS or its Component Societies in setting forth their individual qualifications. *Now* is the accepted time! —W. W. LASHER.

The Dry Gripes

IN 1745, the versatile first civilized American, Benjamin Franklin, published Thomas Cadwalader's "An Essay on the West India Dry Gripes," a disease caused by the lead pipes through which Jamaica rum was distilled. Later it was disclosed that the "dry gripes" was not other than lead poisoning, from these lead worms. Later, in 1768, the imaginative Franklin recorded his own estimate of the effects of lead as an occupational disease among glaziers, letter-founders, plumbers, potters, white lead makers and painters. At this moment, chief concern is not in Franklin's familiarity with this disease but instead with the inelegant, albeit picturesque, designation for it—"the dry gripes" and its many counterparts. Medicine is replete with analogous descriptive terms, many with almost slogan values. "Wool sorters' disease" as a name for anthrax has far more remembrance value than the crisp "anthrax." "Brass founders' ague" has a fetching quality superior to its technical counterpart, "metal fume fever." Such old terms provide haunting nostalgic associations with medical history, but it may be doubted that medicine, apart from its history, helpfully is served by homage to outmoded nomenclature. Chemistry long ago rebelled against such pantry terminology as "sugar of lead," "flowers of sulfur," "milk of magnesia," or "vinegar of wine." While all such designations are still in use, they cause the same crawling of the flesh among chemists as there should arise among physicians from the use of such name monstrosities as "athlete's foot of the hand."

Industrial medicine, particularly in regard to names of occupational diseases, has fallen heir to many traditional designations of dubious worth. Unfortunately industrial medicine is little averse to the perpetuation of some non-scientific terms or to additions to the lot of awkward names. When "saturnism" is used to designate lead intoxication we but harken to alchemy and to astrology. "Pig breeder's disease," while possibly poignant, fails to provide any clue as to its real nature, such as is suggested by its preferred designation, "eruptive meningotyphus." "Mediterranean fever" as a diagnosis for brucellosis in a dairy hand in Wisconsin is just as appropriate as "Canadian pustulous dermatitis" in a race-track worker in Kentucky. Willingness to accept and perpetuate the term "curious bodies" as the scientific name for a certain sign of asbestos exposure seems only to reflect our disposition to mix scientific medicine with "Alice in Wonderland" pronouncements. With the stipulation that a scientific name should not be a phrase, use of "more fibrosis than usual" as a nomenclaturic entity should lead to scurrying to the word mongers or the encyclopedias for a fitter term. "Palsy" is as archaic as Mrs. Garfield's bustle is now useless. In this same category of perpetuated confusion may be found scores of other ludicrous designations, as "banana oil dermatitis" for amyl acetate dermatitis. "Stink damp," however well rooted in mining lore, is a poor textbook substitute for hydrogen sulfide. "Drummer's paralysis" may refer equally to tenosynovitis from the manipulation of drumsticks as to a fatigue neurosis of the traveling salesman from the carrying of heavy hand luggage. "Dead fingers," or "white fingers," are lacking in every quality of good medical terminology. Continue at will.

Apart from nomenclature, but still pertinent to the language and records of industrial medicine, is the inconsistency found in numerical practices. In a single paragraph there may be found reference to lead exposure standards, expressed in units of milligrams per cubic meter of inhaled air, followed by mention of the standard for silica exposure, which by common consent is expressed in relation to cubic feet of inhaled air. Similarly in a single publication, recording of quantities of gases or vapors in the air may be made in part in terms of parts per million, milligrams per liter, or percentage.

Industrial medicine has no purpose to disavow its past, but by the same token industrial medicine has no purpose to perpetuate the past when the bygone only brings confusion to the present. Appreciation of the happiness of one's childhood carries no obligation to carry baby talk into adult years. Now while industrial medicine is youthful enough to be without rigidity of form, it may provide a shining heritage for the future and a monument to its present by provision and espousal of a better nomenclature and more uniformity in its numerical expressions. —CAREY P. MCCORD.

INDUSTRIAL HEALTH AND DISEASE

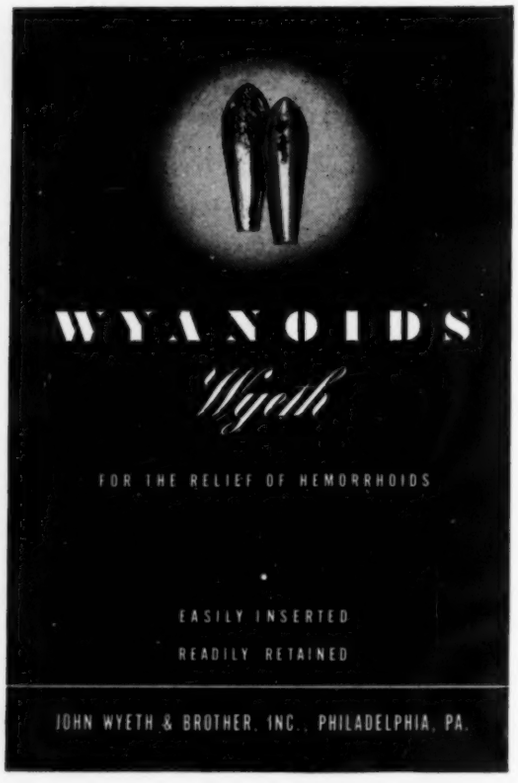
Nutrition and National Defense

FAMINE has always contributed to defeat of armies and subjugation of nations. This has long been recognized, but in the past it was mistakenly thought that famine could be prevented if only the supply of food sufficed. The newer knowledge teaches that the nutritive quality of the foods supplied is of the very utmost importance.

The preceding quotation is one of the opening paragraphs of a very important paper by Wilder which appeared in *War Medicine*, 1:43.

Wilder goes on to say that procurement of calories is a relatively simple matter since abundant stocks of sugar and flour are available in the United States. For the average man engaged in ordinary, non-strenuous occupations, the daily requirement or "consumption unit" is around 3000 calories, but soldiers require from 4000 to 5000.

That proteins are essential for normal subsistence is commonly recognized, but more important is the fact that quality should be sought in their selection. The protein found in meat, eggs, milk, cheese, and certain vegetables, such as the soy bean, is probably of optimum biologic value. Approximately 70 grams or 2½ ounces of protein is usually considered adequate, but even less will do if quality is maintained. The role of fats in the human economy is not altogether clear, for besides their energy value



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Of INDUSTRIAL MEDICINE, published monthly at Chicago, Ill., for October 1, 1941.

State of Illinois } ss.
County of Cook }

Before me, a Notary Public in and for the State and county aforesaid, personally appeared Stephen G. Halos, who, having been duly sworn according to law, deposes and says that he is Business Manager of INDUSTRIAL MEDICINE and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933, embodied in section 537, Postal Laws and Regulations, printed on the reverse of this form, to wit:

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Stephen G. Halos, Business Manager

Sworn to and subscribed before me this 27th day of October, 1941.

Hollie Fisher, Notary Public.

[SEAL] (My commission expires June 7, 1945)

they aid in the absorption and retention of certain vitamins or their precursors. Furthermore, there are certain members of the group, such as linolic acid, without which disability of the organism might result. The position of the carbohydrates in the modern dietary has been shifted to one of lesser importance, particularly since caloric requirements are provided from other sources.

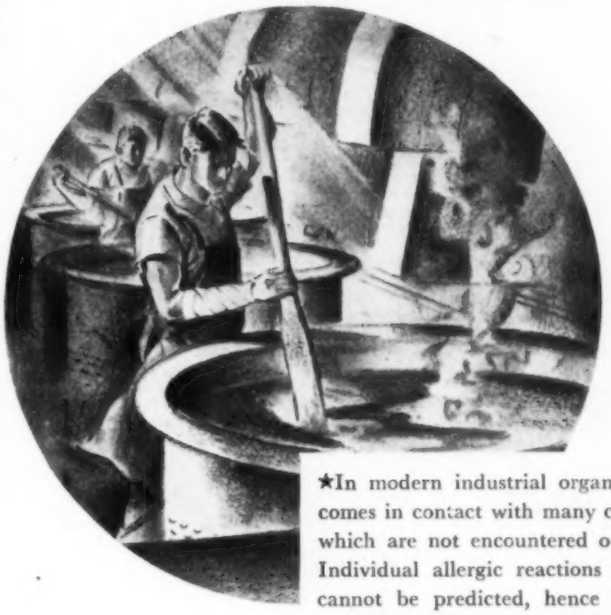
The importance of substances formerly termed "accessory factors," namely the mineral salts and vitamins, has lately been receiving more and more emphasis. Among the former, sodium, potassium, calcium, iron, chlorine, iodine,, and phosphorus have outstanding significance. That insufficient sodium chloride in the diet may lead to heat exhaustion, incapacity, and even death is well known. Our Navy requires a receptacle containing salt to be close to the drinking fountains on the battleships. Similarly, the addition of small amounts of salt to the drinking and cooking water has been recommended for the Army. Calcium is present in our dietaries to a lesser extent than is desirable. For the average man, less than 0.8 gram is thought to be inadequate; and this amount is unavailable unless a pint of milk or some equivalent dairy product is included in the daily diet. It is common knowledge that skeletal demineralization and nervous instability may be provoked by a shortage of calcium. The relationship of iron insufficiency to anemias occurring in adolescents, women, and others is quite well understood.

Wilder gives the vitamins high rank as elements essential to the American dietary, pointing out that their lack may give rise to physical and mental inefficiency long before outstanding or readily recognizable disease appears. He also refers to vitamin deficiencies as "hidden hungers" which constitute subclinical abnormalities which, until recently, were unrecognizable. Although recent studies have revealed the prevalence of frank pellagra in the Southeastern States, there are many more cases of "prepellagrins" among both white and negro workers. Ordinarily they do not seek medical attention, but if they should happen to be afflicted with infection they enter the hospital and during the course of examination show evidences of concomitant vitamin deficiency. In the Northern States, thiamine is more often lacking in the diet than nicotinic acid; and the degree of deficiency seldom is so severe as to require the attention of a physician. Although beriberi is seldom seen in the United States, Wilder calls attention to the fact that many Americans are nervous and apprehensive or irritable, tired, and listless—symptoms which may result from thiamine deficiency. He refers to his associates, Williams *et al.*, at the Mayo Clinic, who with rigidly controlled experiments on human subjects have convincingly demonstrated that restricted intake of thiamine in otherwise adequate diets gave rise to fatigue, nervous instability, prevented the individual from properly performing routine duties, and eventually led to defeatist attitudes.

Wilder takes pains to emphasize that such symptoms are so prevalent in office practice that many physicians have come to make light of them, the usual diagnostic designations being neurasthenia or chronic nervous exhaustion. This fact is borne out by the work of McLester *et al.*, whose study of pellagrins has disclosed that a large number who had previously been admitted to the hospital because of "neurasthenia," were successfully treated with thiamine hydrochloride, nicotinic acid, and other components of a pellagra-preventive diet.

Certain common vitamin deficiencies are due to a shortage of either part or whole of the B complex; and this may be attributed to our changing dietary habits. Formerly, about half of our calories were obtained from undermilled grains, but nowadays we depend to a large extent on white flour and sugar, partly because of our "sweet tooth" and partly due to low costs. Recently, two committees on food and nutrition have been organized, one representing the A. M. A. and the other the National Research Council, and as a result of their cooperation it is hoped to increase the

Occupational Dermatoses
AND THE WHEELS OF INDUSTRY



★In modern industrial organizations the worker comes in contact with many chemical compounds which are not encountered outside of the plant. Individual allergic reactions to these substances cannot be predicted, hence the relatively high incidence of contact dermatites. However, incapacitation and loss of time need not result. Through the specific antipruritic action of Calmitol Ointment, the itching of contact dermatitis is promptly allayed; a single application is usually effective for several hours. In open lesions, Calmitol Ointment affords the protective influence of its lanolin-petrolatum base, thus aiding in resolution. A dispensing jar of Calmitol Ointment will also find frequent use for such pruritic affections as eczema, food and drug rashes, intertrigo, ringworm, etc.

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consumption of the more important factors of the vitamin B complex. These agencies have adopted a policy by which flour or bread may be fortified with adequate quantities of the essential vitamins. "Enriched flour" may be made by addition to white flour of thiamine, nicotinic acid, and iron in amounts such that the content of these factors will approximate that found in flour milled to use 85 percent of the wheat, or it may be made by improved processes so that the vitamins originally present in the wheat are retained.*

Scurvy has always been a problem in the cold climates and it has also been a problem of military importance, since the lack of vitamin C is known to increase susceptibility to tuberculosis and other infections. Although a degree of uncertainty surrounds the functions of vitamins A and D, diets are considered to be too low in the former, and the adult and adolescent requirement of the latter is as yet undetermined. The experience of Denmark during the first World War when large quantities of butter were exported to Germany, stressed the significance of vitamin A with regard to maintenance of epithelial integrity. That children, through insufficient exposure to the sun, receive too little vitamin D is common knowledge. The value of either of these vitamins to the armed forces is still an unsettled question.

As the result of the report by Stiebling based on the food purchases of representative portions of our urban and rural population, it has been demonstrated that not more than one-fourth of our families subsist on a good dietary, whereas a little over one-third consume diets which are fair, and the other one-third or more have diets which are poor. Though some skepticism has been expressed regarding this report, states Wilder, other surveys such as the Rockefeller study in North Carolina, the Youmans report in Tennessee, and the one conducted under the auspices of the Milbank Memorial Fund have all substantiated Stiebling's findings. The author believes that the standards used in all of these surveys are lower than those regarded at present as representing satisfactory nutrition.

Wilder concludes that the efficiency of our man power must be as good as the machines at their disposal. The war of today can be resisted only if impoverished diets are eliminated, and the moral and mental fiber will be such that fear (an early symptom of nutritional deficiency) will be largely eliminated. It is important at this time to secure the full cooperation of the many public and private groups which are able to contribute to the improvement of the nation's nutritional status. Not only speed but also stamina and determination are pressing needs in the current emergency, and self-confidence, courage, and will to do are directly affected by "what men have for food."

From "Highlights of Current Literature," in *Roche Review*, August, 1941. "In the interests of national defense all American physicians ought to give serious thought to the facts and opinions set forth in Dr. Wilder's paper. The editorial board of *War Medicine* points out that Dr. Wilder's opinions, as expressed in his original article, are his individual opinions and do not necessarily reflect the official views of the Committee on Food and Nutrition of the National Research Council (of which he is chairman) or of any Government Department. EDITOR, ROCHE REVIEW.

*Since this article was written the official requirements were changed to include Riboflavin. —EDITOR.

—*Continued from page 13*

requirements. And no two persons who require a special diet need the same balance. It is the function of restaurants to: (1) List on the menu a variety of green, yellow, white and other colorful above and below-ground vegetables prepared to scientific standards. (2) Have fruit in some form available on your breakfast, luncheon and dinner menus. (3) Provide a range of cereal foods so that there can be a variety for each meal (many of these products are now fortified by the packers and can be featured as fortified foods). (4) Offer milk and eggs at all times and other dairy products for luncheon and dinner. (5) Decrease the number of mushy and starchy dishes. (Most of those interviewed stated that this is the only criticism that can be aimed at the restaurant business as a whole.) (6) Feature and push the sales of meat (yes, even expensive steaks and chops priced to show a profit). Now more than ever before, say doctors, it is necessary for most people to eat more foods that 'stick to the ribs.' (7) Strive harder than ever before to add flavor to the menus by better seasoning and the use of relishes, pickles, sweets, edible garnishes and a variety of appetizers and desserts. All specialists agree that restaurants should (and most of them do) sell clean, wholesome, flavorful, well-cooked foods in variety and let the customer and his doctor establish his diet. When your customers no longer eat and drink for the pleasure of it, you are on your way out of the restaurant business. And remember the National Restaurant Association slogan, 'Good Food is Good Health.'"

A NEWLY founded branch of the Asociación Médica Argentina is the Sociedad de Medicina Industrial in Buenos Aires. Its task is to study the dangers to the health of the worker created by fatigue, lack of cleanliness, use of toxic substances, illumination, and so on.—*J.A.M.A.*, November 29, 1941.

THE Fourth Annual Congress on Industrial Health, sponsored by the American Medical Association's Council on Industrial Health, DR. CARL M. PETERSON, Secretary, will be held at the Palmer House, Chicago, January 12 and 13, 1942.

Tuberculosis in Industry

DR. CHARLES J. HATFIELD, since 1913 Associate Director, Henry Phipps Institute, Philadelphia, at the Fortieth Anniversary Meeting of the Ohio Public Health Association, Friday, November 14, 1941, referring to industrial employment, said: "Rehabilitation is a major unsolved problem in tuberculosis." At the same meeting, DR. H. KENNON DUNHAM, President, Ohio Public Health Association, and Associate Professor of Medicine and Head of the Department of Tuberculosis, College of Medicine, University of Cincinnati, said: "From the medical standpoint, no person will starve to death quicker than the tuberculosis patient, whether he is in an active or arrested stage. Hence, the subject of nutrition is especially vital to him." Also, from the Saranac Lake Symposium on Tuberculosis in Industry, 1941: "The tuberculosis problem in industry cannot be divorced from tuberculosis in the general population."

DR. O. A. SANDER, of Milwaukee, writes on "Tuberculosis Case Finding in Industry" in *Wisconsin Med. J.*, for November, 1941. Following a statistical analysis by age groups of the incidence of tuberculosis in 17,355 industrial workers, he concludes, from the studies, as follows: (1) Workers above age 30 offer the most fertile field for the discovery of tuberculosis. (2) Although the incidence of significant tuberculosis is considerably higher among employees in dusty trades, the percentages are sufficiently high among those not exposed to dust to warrant more thorough case finding projects in industry generally. (3) A well-taken roentgenogram of the chest repeated periodically for all employees is the least that should be done to assure an adequate program for the control of tuberculosis in industry. (4) It is recommended that roentgenologic studies eventually be included in a general health program rather than carried on as an isolated project in any industry. (5) Experience shows that it is advisable that one physician be made responsible for the health of the workers in any one plant rather than to allow each worker to have his own physician make the necessary examinations. (6) The general physician who has adequate x-ray equipment and a genuine interest in preventive medicine is competent to assume the responsibility for the control of tuberculosis and the general health in any plant.

WANTED: Position as industrial nurse, preferably in New Jersey. Experience includes 10 years of operating and private surgical and medical nursing. Address: D. W., c/o INDUSTRIAL MEDICINE.

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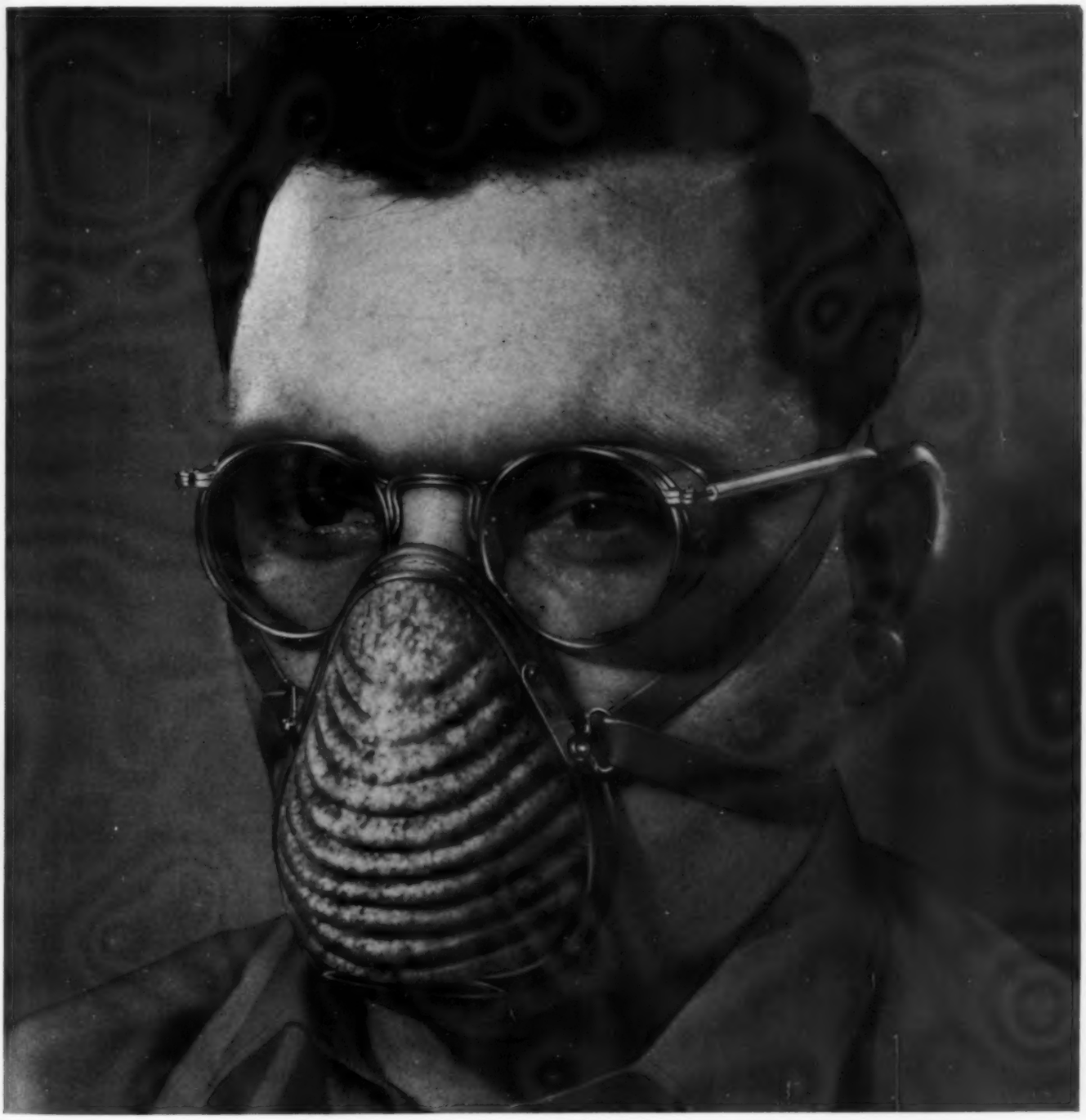

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